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Space Log

1957 - 1991

TRW

International Space Year 1992

The 1991 Space Log, published during
the International Space Year 1992 and
featuring a comprehensive listing of launch
data from 1957-1991, commemorates
the year-long observance.

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International Space Year and the New World Order

No one could have imagined seven years ago the shape of the world in 1992. The dissolution of the Soviet Union has indeed created a new world order with repercussions in every corner of the geopolitical landscape, including space.

Nevertheless, it was that long ago, in 1985, that the seeds of the International Space Year (ISY) were planted by the late Senator Spark Matsunaga (D-HI) and his aide Harvey Meyerson. It was less a matter of prescience than hope that the future would bring increased international cooperation in space that prompted them to begin the process of establishing ISY, a path that led to the White House and then to the world's international scientific and engineering communities. Ultimately, most of the world's space agencies became involved through the Space Agency Forum for the International Space Year (SAFISY), created by ISY planners as a coordinating group for governmental ISY-related activities. More than 25 space agencies are members of SAFISY, creating a one-of-a-kind forum for governments to exchange ideas on future space programs.

In fact, SAFISY seems destined to outlive ISY itself, which, technically, exists only for the year 1992. As space projects become increasingly international in character, an organization like SAFISY is not only advisable, but essential. The world of space is changing minute by minute, and a structure for facilitating information exchange – and perhaps cooperation as well – is a promising development.

How is space cooperation changing? The obvious answer is the impact of the dissolution of the Soviet Union. The Soviet space program was often proclaimed by U.S. space supporters as the challenge to which we needed to respond. Though it is questionable whether Soviet space activities actually influenced U.S. space policy after the Apollo era (with the exception of certain military space programs), the perception certainly existed among U.S. taxpayers that the United States needed to be "ahead" of the Soviets. Cooperative space relationships were drawn along political lines – the United States with Western partners, the Soviets with their Warsaw Pact allies. Though there were some exceptions (long standing Soviet-French space cooperation, for example), by and large it was West against East in space as on the earth.

Now the Cold War is over. The Soviet space program is no longer a threat, and the Commonwealth of Independent States (CIS) is deciding what parts of that program it will keep. What space cooperative relationships will develop? Will Japan team up with the CIS to gain access to its launch sites (so the Japanese government will no longer have to negotiate with fishermen over how many launches per year can be conducted from Japan's own launch sites) or buy all the "good" CIS space technology and incorporate it into their own program? Will Russia and Ukraine decide to join the European Space Agency instead of maintaining a CIS space program, with Kazakhstan's Baikonur Cosmodrome left to wither or to become a commercial international spaceport? Will all space-faring countries open themselves to greater cooperation, leading someday to a single international space agency?

The possibilities are endless and ISY is fortuitously timed to serve as a catalyst for such discussions. Both through public activities and governmental interactions, 1992 should be remembered as the year the new world order in space began.

Marcia S. Smith

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The views expressed here do not necessarily represent those of the Congressional Research Service or the Library of Congress.

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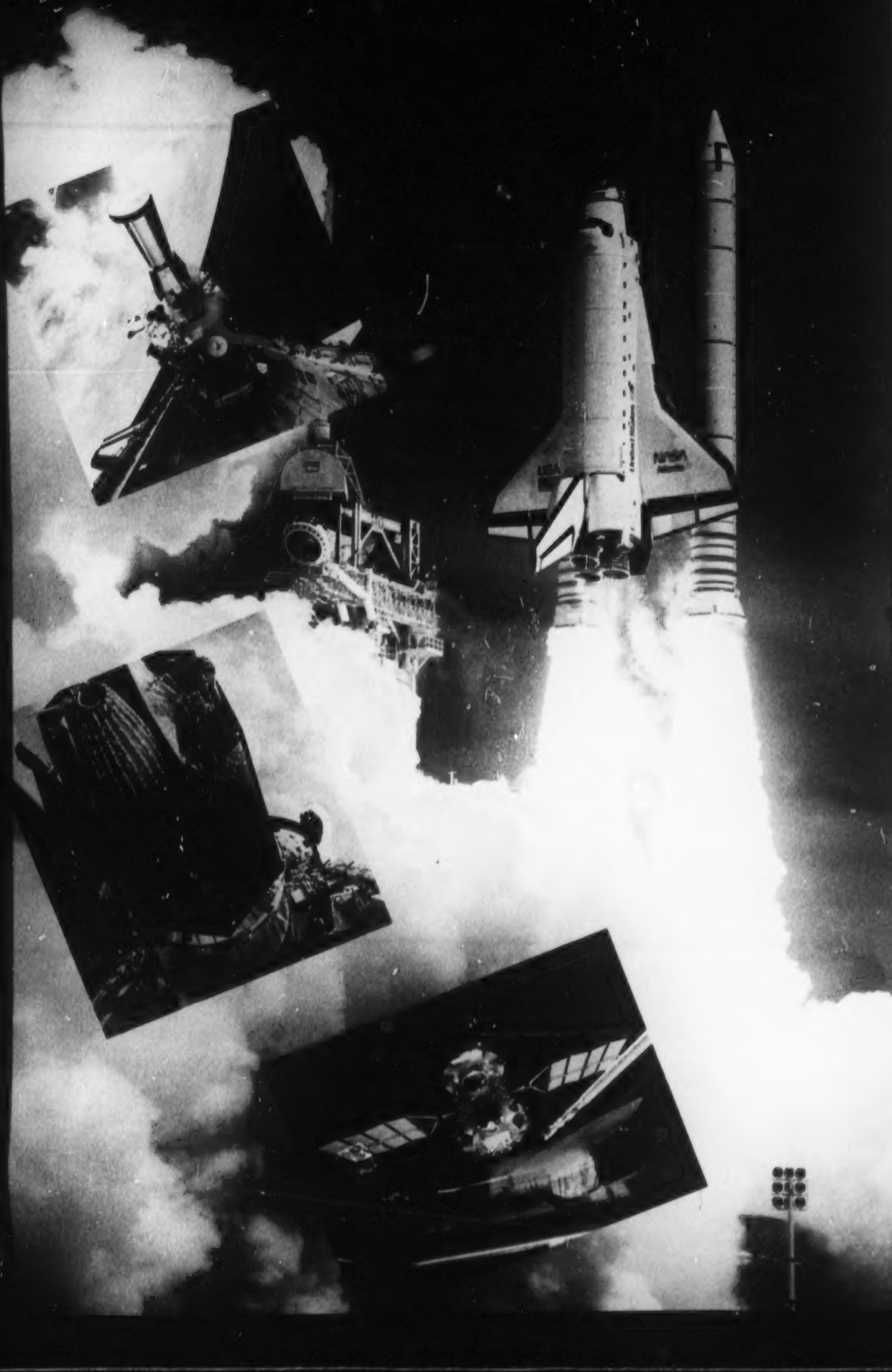

USA
NASA

Spacecraft Details

Includes most major launches. Spacecraft/launch data are listed chronologically. All times cited are GMT unless otherwise indicated. For additional details, refer to 1991 Summary Log of Space Launches.

NATO IVA

A communications satellite serving the North Atlantic Treaty Organization and British Ministry of Defense was launched from Cape Canaveral by a Delta 2 at 00:53, January 8. NATO IVA is the first of two new-generation commsats offering secure military and diplomatic voice and data communications to NATO member nations and troops in the field. The satellites offer spot beam and global pattern coverage to reach a wide range of ground stations and ships at sea. The communications package houses four SHF and two UHF channels. The payload is provided by Marconi Space Systems; the satellite is built by British Aerospace. Based on the Skynet 4 design, it is box-shaped, measuring 2.1 m high by 1.9 m long by 1.4 m wide. Solar arrays span 16 m and provide 1,200 W at end of life. NATO IVA weighed 1,433 kg at launch. The satellite is operational above 18 deg. w and has a seven-year design life. NATO IVB is scheduled to fly in 1993 or 94.

Italsat 1

Italy's first national communications satellite, Italsat 1, was dual-launched aboard an Ariane 44L from Kourou, French Guiana, January 15 at 23:10. Placed in geosynchronous orbit above 13.2 deg. e, the satellite serves as a spaceborne telephone switchboard, redirecting up to 12,000 calls at once. Italsat is experimental in nature, a pre-operational component of a proposed digital satellite network for Italy. Built by Selenia Spazio for Agenzia Spaziale Italiana (the Italian Space Agency), Italsat 1 is box-shaped, measuring 2.72 by 2.22 by 3.48 m; it is 6.1 m tall with its two 2-m reflector antennas deployed. Solar arrays span 21 m and provide 1,600 W of power. It weighed 1,865 kg at launch. Italsat's communications package houses six 20/30 GHz multibeam transponders, three 20/30 GHz global beam transponders and a propagation experiment operating at 40/50 GHz. The multibeam system, using advanced time division multiple access (TDMA) techniques, is expected to undergo two years of testing; the global beam system is considered operational from the start and will be used to test new services. Italsat 1 has a five-year design life, but the accuracy of its orbital insertion saved maneuvering fuel, giving it a predicted two-year life extension.

(left) Top to bottom
Defense Support Program Satellite
Tracking and Data Relay Satellite
Compton Gamma Ray Observatory

Eutelsat 2 F2, F3

The second and third in a series of new-generation European Telecommunications Satellite Organization (Eutelsat) commsats were launched January 15 and December 7, respectively. Eutelsat 2 F2 rode behind Italsat 1 on an Ariane 44L, lifting off at 23:10 from the Kourou launch site. Eutelsat 2 F3 was cast into orbit from Cape Canaveral aboard the first commercial flight of Atlas 2 at 22:47. The satellites provide TV, telephone, telex and data transmission services to the European Community. The Eutelsats carry sixteen 50-W ku-band transponders; signals can be received on small 60 to 70-cm antennas. Built by a consortium led by Aerospatiale, the satellites measure 1.3 by 1.3 by 2.7 m. Solar arrays span 22.4 m when deployed and provide 3,000 W of power. F2 weighed 1,878 kg at launch; F3, 1,874 kg. They have an eight-year design life. The Ariane-launched satellite was colocated with Eutelsat 1 F5 above 10 deg. e. Traffic was transferred from the elder satellite and commercial service via the new craft commenced in March. Eutelsat 1 F5 was then moved to 21.5 e. Flight 3 was delayed several months while Atlas manufacturer General Dynamics investigated an April Centaur stage failure. Atlas 2 uses a Centaur second stage. The new booster, at 47.5 m is 3.6 m taller than Atlas 1. It generates an additional 40,000 lbs thrust and can deliver 2,675 kg to geosynchronous transfer orbit. Its debut flight lofted Eutelsat 2 F3 towards its orbital slot at 16 deg. e, where it was expected to be on line by January 1992.

Astra 1B

ASTRA 1B GE Astro-Space

A direct broadcast satellite was dual-launched with MOP 2 aboard an Ariane 44LP from the Kourou launch facility, 23:36, March 2. Astra 1B provides TV programming to some 90 percent of the metropolitan and urban areas of Western Europe and the Canary Islands. Its communications payload consists of 16 active 60-watt Ku-band transponders and six spares. Signals can be received on small 60-cm dishes. Colocated with Astra 1A above 19.2 deg. e, Astra 1B boosts system capacity to 32 TV channels and radio broadcasts. Astra 1B was built by GE Astro-Space for Societe Europeenne des Satellites (SES), Luxembourg. It is box-shaped, measuring 2.9 by 2.3 by 2.2 m. Solar arrays, supplying 3,700 W at end of life, span 24.4 m. The satellite weighed 2,620 kg at launch, 1,582 kg on orbit. It has a 10-year design life.

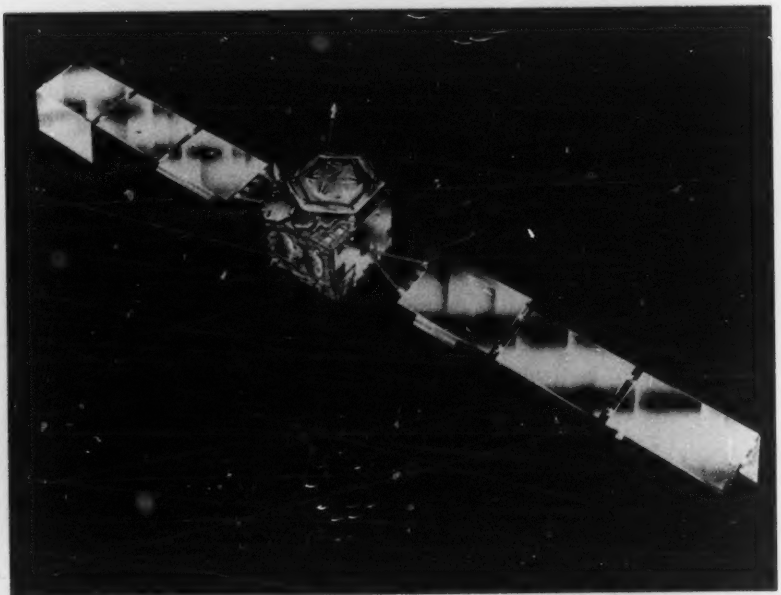
MOP 2 (Meteosat 5)

MOP 2 Courtesy Bruce Battrick, ESA

Europe's second operational meteorological satellite, MOP 2, joined Astra 1B on an Ariane 44LP launch, 23:36, March 2. Operated by the European

Space Agency on behalf of the 16-member Eumetsat, the satellite provides weather forecasters with infrared and visible light images of earth and its cloud cover. Data is also used by climatologists and atmospheric physicists. Images are captured by its onboard multispectral radiometer every 30 minutes and dispatched to a dedicated ground station for processing. Processed images are distributed to users via the satellite or ground links. Infrared image resolution is 5 km; visible band resolution is 2.5 km. The satellite, built by Aerospatiale for ESA, is 2.1 m in diameter, 3.1 m tall. It weighed 681 kg at liftoff. The designator MOP 2, for Meteosat Operational Program, was changed to Meteosat 5 once the satellite arrived on station. It joins four other satellites in the Meteosat family and is serving as an on-orbit spare at 4 deg. e. The satellite has a five-year predicted lifetime.

Inmarsat 2 F2, F3

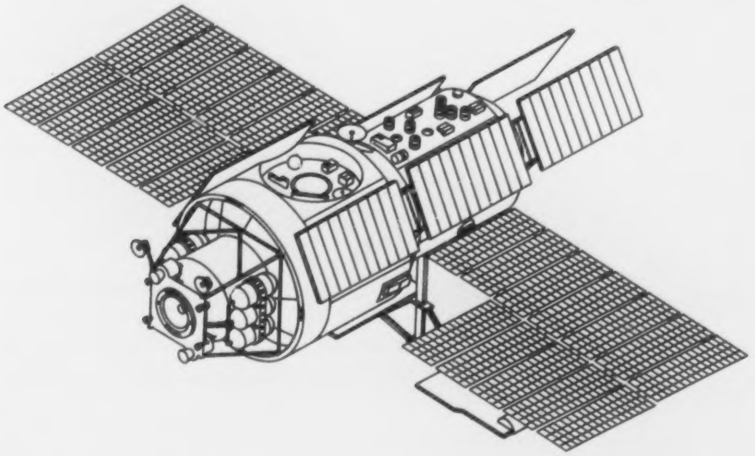


Inmarsat 2 Courtesy British Aerospace

Capacity of the International Maritime Satellite Organization's communications network increased by some 500 circuits with the launch of Flights 2 and 3 in the Inmarsat 2 series. Inmarsat 2 F2 was launched from Cape Canaveral at 23:03, March 8, aboard a Delta 2. Flight 3 followed on December 16, at 23:19. It was tandem-launched with Telecom 1A aboard an Ariane 44L from Kourou. The satellites operate at L and C-band to provide telephone, telex, facsimile and data services to maritime, aeronautical and mobile users. Ship-to-shore service is from L to C-band (1.6/3.6 GHz); shore-to-ship from C-band to L (6.4/1.5 GHz). Each Inmarsat 2 has a 250 voice circuit capacity. The network presently serves some 10 thousand vessels. Based on the British Aerospace/ Matra Espace Eurostar platform, the BAe-built satellites are 2.5 m high, 1.5 m long and 1.4 m wide. Solar arrays spanning 15.2 m supply 1,142 W at end of life. Four cup dipole phased array antennas providing separate receive and transmit capability for both operating frequencies are mounted on the earth-facing wall. Flight 2 weighed 1,385 kg at launch; Flight 3, 1,310 kg. The second in the series of four Inmarsat 2s was declared operational above 15.5 deg. w in April. Its sister satellite began service above 178 deg. e in January 1992. Both have 10-12 year projected lifetimes.

Almaz 1

The first Soviet commercial remote sensing satellite was launched from Tyuratam at 15:12, March 31 by a Proton (SL-13) booster. Almaz 1 is also the first commercial sensing satellite to use radar instead of conventional photographic and infrared imaging. Synthetic aperture radar allows it to capture earth images at night, through clouds and under water. From its perch in near-polar orbit, Almaz covers most parts of the globe every one to three days. Radar panels on either side of the craft scan a 200 to 350-km slice of terrain on each pass. Image resolution is 15 m. A secondary payload, an infrared radiometer, captures a 150-km strip of earth. Infrared resolution is 30 m. Almaz 1 is a follow-on to Kosmos 1870, a non-commercial radar imager

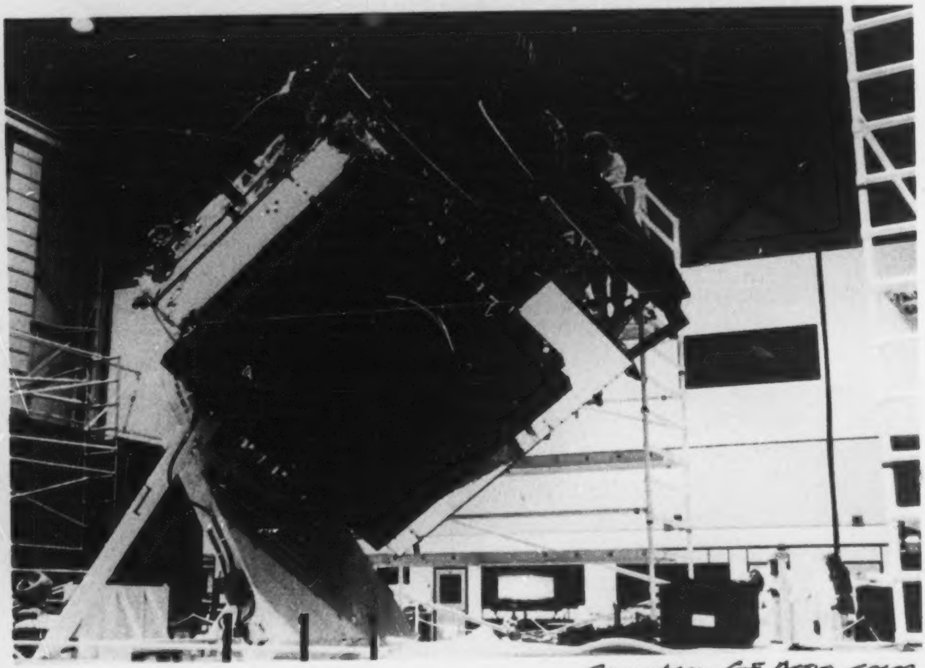


Almaz 1

Drawing by Dan Gauthier

launched in 1987. The new satellite, built by Mashinostroyeniye (formerly part of the Chelomei Bureau), is based on the modular Salyut design. It weighs 18.5 metric tons, and measures 15 m long by 4.2 m in diameter. Two 43-sq-m solar panels, providing 2.5 kW, are attached to its forward module. Almaz began transmitting initial images in early June.

Anik E2, E1



Anik

Courtesy GE Astro-Space

Two fifth-generation Canadian telecommunications satellites were orbited via Ariane 44Ps to fill that nation's satellite broadcasting needs into the next century. Anik E2 was launched April 4 at 23:33; Anik E1, September 26, 23:43, from Kourou, French Guiana. The satellites, weighing 2,923 and 2,977 kg, respectively, are the largest North American domestic commsats launched to date and required the extra lift of four Ariane solid propellant strap-on boosters. The Anik E series carries two dozen 12-W C-band transponders plus six spares, and sixteen 50-W Ku-band transponders, with two spares. Coverage extends throughout Canada and a large portion of the U.S. The satellites were manufactured by Spar Aerospace for Telesat Canada. The bus was provided by GE Astro-Space. The main body measures 2.8 by 2.3 by 2.4 m; solar arrays, generating 3,888 W, span 21.5 m. Anik E2 arrived on station at 107.3 deg. w as planned, but its orbital debut was dampened when the C-band antenna did not deploy. With earth sensors covered by the stuck antenna, operations were impossible. For nearly three months, the satellite was spun up, slowed down, heated and cooled in repeated attempts to free the antenna. Telesat was prepared to write the bird off. Relentless engineers tried a series of dual spin turn maneuvers, with the satellite spinning up to 4.5 rpm. On July 3, the C-band antenna swung free. Although the rescue maneuvers used about a year's worth of fuel, Anik E2 still has a 12-year life expectancy. After a two-month test phase, Ku-band service was transferred to the new satellite from Anik C1, and C-band service from Anik D1 and D2. In contrast, Anik E1's antennas deployed without incident October 2. In position above 111.1 deg. w, it began service in November.

STS-37

Packing a NASA observatory, seven secondary science payloads and a five-person crew, shuttle Atlantis lifted off from Kennedy Space Center pad 39B at 14:22, April 5. The orbiter weighed 115,502 kg at launch; total vehicle weight was 2,047,178 kg. Much of the load was the Gamma Ray Observatory (GRO), at 15,620 kg the heaviest payload shuttle-launched to date. STS-37 was staffed by Commander Steven R. Nagel, Pilot Kenneth D. Cameron, Mission Specialists Linda M. Godwin, Jerry L. Ross and Jay Apt. GRO deployment was scheduled for mission day three; an EVA to test conveyance carts and construction aids for large space structures was on the docket for day four. As it happened, GRO deployment was delayed and the first spacewalk since 1985 commenced a day early. Plans were changed by a stubborn antenna. Midway through GRO's deployment sequence, while still attached to the remote manipulator arm, the satellite's high gain antenna boom stuck in its stowed position. Repeated maneuvers to free it failed. Astronauts Ross and Apt were called on to free the boom by hand. Seventeen minutes after the pair exited Atlantis, Ross released the boom. GRO was ultimately cast into orbit only 4.5 hrs later than planned. While outside the shuttle, Ross and Apt began the scheduled equipment tests, evaluating hand rails and foot restraints. They reentered the shuttle after 4 hrs, 38 mns. Outdoor activities resumed the next day, with the team testing manual and electric personnel carts during a 6-hr, 11-mn EVA. Several times during the flight, Atlantis passed within view of the Mir station. The crew attempted to contact their Soviet counterparts via ham radio, but were unsuccessful. Landing was delayed one day by gusty winds at Edwards AFB. The 5-day, 23-hr, 33-mn mission concluded on Edwards' runway 33 at 13:55, April 11.

Gamma Ray Observatory

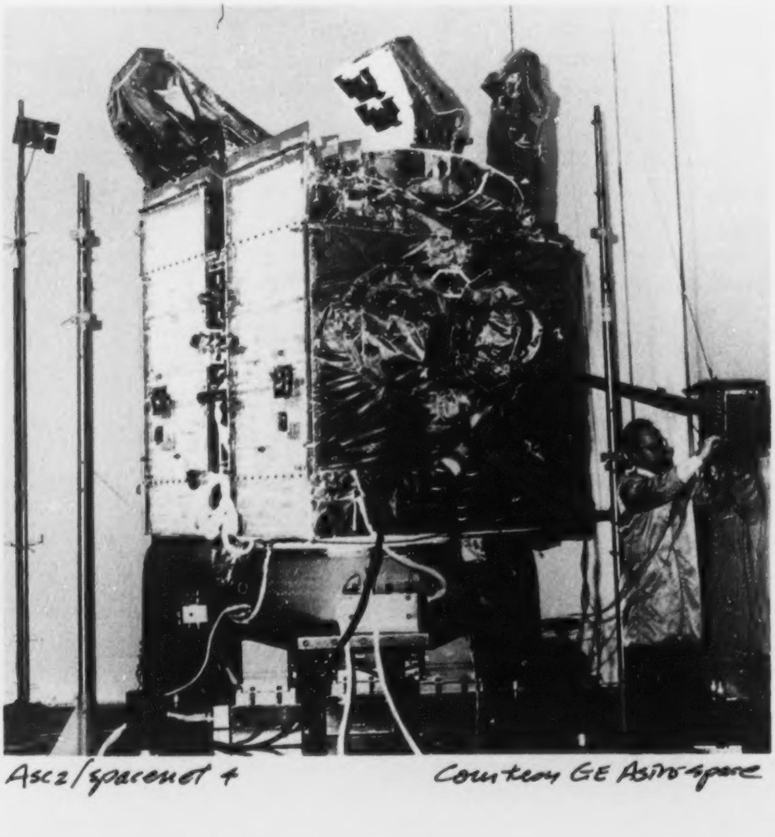
GRO

Courtesy TRW space & Technology

The second in a series of four NASA Great Observatories was deployed from the shuttle Atlantis at 22:47, April 7. The 15,620-kg Gamma Ray Observatory is an orbiting platform hosting four experiments that detect the gamma ray emissions of cataclysmic cosmic events — black holes, pulsars, quasars. Because gamma rays travel through space unimpeded, they reach earth in their original state. Arriving undisturbed from the far reaches of the universe where the remnants of creation reside, gamma rays bear clues to the forces of the Big Bang. Although GRO's orbital insertion was delayed by a recalcitrant high-gain antenna (see STS-37), its 15-month sky survey mission began on target, May 16. Built by TRW Space and Technology Group for NASA Goddard, GRO measures 4.6 by 9.1 m. Solar arrays spanning 21.4 m supply 4,300 W of peak power, 2,000 W at end of life. Renamed the Compton Gamma Ray Observatory for physicist Arthur Holly Compton, GRO had, by year end, found quasars some 10 to 20 billion light years from earth, observed the glow of matter-antimatter annihilation and detected some 200 gamma-ray bursts. The bursts, once thought to originate from the Milky Way, have been seen all over the sky. This discovery may change present theories of the universe. GRO's observations complement the visible wavelength data gleaned by the Hubble Space Telescope. The X-ray and infrared portions of the spectrum will be covered by the future Advanced X-ray Astrophysics Facility and proposed Space Infrared Telescope Facility.

ASC 2/Spacenet 4

A commercial communications satellite serving the U.S. and Puerto Rico was launched at 00:09, April 13, aboard a Delta 2 from Cape Canaveral. The 1,350-kg commsat carries 18 C-band and 6 Ku-band transponders for TV news and interactive data transmissions to private networks and small terminals. ASC 2 is the second of two satellites built by GE Astro-Space for Contel ASC. A subsequent merger between Contel and GTE Spacenet brought the satellite into the GTE fold; its name was changed to Spacenet 4 after launch. Stationed above 101 deg. w, it joins three Spacenet satellites, four GStars and ASC 1 to complete the merged GTE/Contel constellation. The existing fleet is covering for three Ku-band transponders aboard Spacenet 4 that failed on orbit. Spacenet 4 is box-shaped, measuring 1 by 1.3 by 1.6 m. Solar arrays span 14.1 m. It has a 10-year design life.



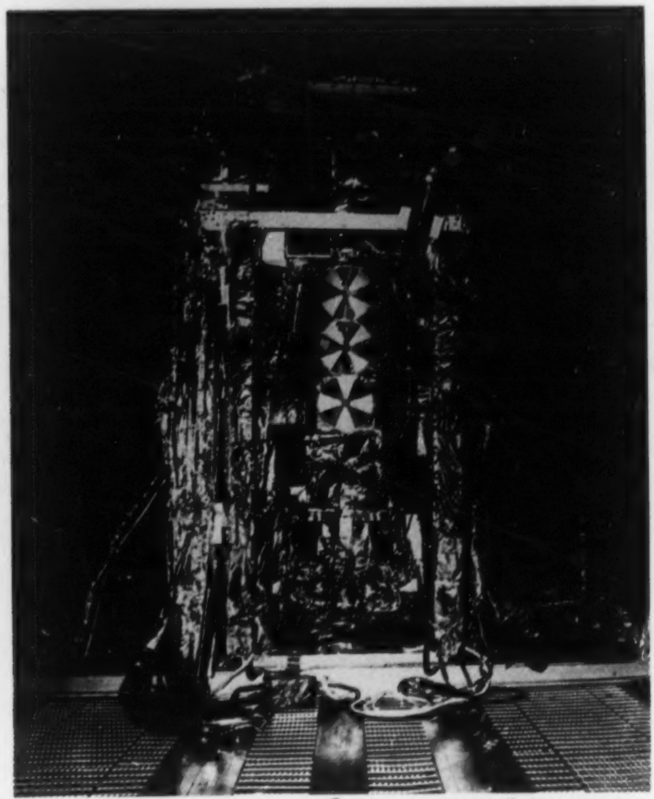
Asc2/spacenet 4 Courtesy GE Astro-space

STS-39

The space shuttle's first unclassified military mission commenced at 11:33, April 28, with Discovery's liftoff from Kennedy Space Center pad 39A. The purpose of the flight was to gather data needed to develop spaceborne sensors and software that can recognize missile or reentry vehicle signatures as they fly through or above the atmosphere. To that end, Discovery carried Air Force and Strategic Defense Initiative-sponsored instruments to observe gases in the upper atmosphere, emissions from the shuttle engines, and chemicals released from co-orbiting subsatellites. Orbiter/cargo weight was 111,884 kg; total launch weight was 2,044,252 kg. The scheduled observations required the crew to work around the clock in 12-hour shifts. Michael L. Coats was mission commander; Blaine Hammond, Jr. was the pilot. Gregory L. Harbaugh, Donald R. McMonagle, Guion S. Bluford, C. Lacy Veach and Richard J. Hieb served as mission specialists. The primary Air Force payload—a Cirris infrared telescope, secondary sensors and an ultraviolet camera—was activated three hours into the flight. Two failed tape recorders curtailed data collection until the crew rigged a bypass on mission day seven. The Infrared Background Signature Survey (IBSS) instrument, mounted on the Shuttle Pallet Satellite (SPAS), was deployed May 1. A pointing error stalled the experiment for nine hours. With IBSS/SPAS in position, the shuttle undertook a series of fast Orbital Maneuvering System (OMS) and Reaction Control System (RCS) burns. During the 27-mn sequence, and three encores, the IBSS photographed Discovery's exhaust plumes. The free-flyer subsequently observed chemicals released from three subsatellites ejected from the cargo bay. A fifth satellite was deployed several hours before landing. Discovery's return to earth was rerouted to KSC due to high winds at Edwards AFB. It touched down on the concrete runway at 18:55, May 6, after 8 days, 7 hrs, 22 mns in orbit. Despite several technical problems, the returns from STS-39 surpassed expectations and will serve as a database for missile defense system development.

NOAA-12

A refurbished meteorological satellite was lofted into a sun-synchronous orbit via an Atlas E from Vandenberg AFB, at 15:52, May 14. The NOAA-D satellite, designated NOAA-12 after launch, is the last of an earlier Tiros-N series (NOAA A-D) of weather watchers built by GE Astro-Space. NOAA-D was put in storage when the Advanced Tiros-N series came of age with the launch of NOAA 8 (NOAA E) in 1983. Flight 12, upgraded for this mission, carries five instruments to measure cloud cover and surface temperature, energy from the troposphere and earth's radiation belts. Data is disseminated to worldwide users for weather forecasting; agriculture, fishing, forest, and flood management; vegetation mapping; oceanography and global change research. The satellite is five-sided, measuring 3.7 m long by 1.8 m wide. It weighed 1,416 kg at launch. NOAA 12 replaces NOAA 10, on orbit since 1986 and near the end of its operational life. The satellites are managed by NASA Goddard Space Flight Center for the National Oceanic and Atmospheric administration.



NOAA Courtesy GE Astro-space

Resurs-F 10-13

The Soviet remote sensing program continued in 1991 with the launch of four Resurs-F satellites. All flew from Plesetsk aboard Soyuz (SL-4) vehicles. The satellites carry cameras to photograph earth's surface for civilian-sponsored observations. Film is stored within the camera system and the entire package is returned to earth via recoverable capsules. The first mission, Resurs-F 10 was launched at 09:07, May 21 and recovered June 20. It housed an MK4 camera system which includes a multispectral and stellar camera. A second two-camera satellite, Resurs-F 13, followed on August 21, 10:49. It was recovered September 20. Both orbited lower than previous Resurs flights, averaging 225 to 240 km altitude. Flight 11, launched June 28, 08:10, carrried the Priroda 4 version of the earth resources imaging system. It contains two wideframe cameras, three multispectral cameras and a stellar camera. It was retrieved July 21. Flight 12, also housing the Priroda 4, flew on July 23, 09:04 and was recovered August 8. The Resurs-F craft, manufactured by KB Foton, are cone-shaped, 4.6 m long with a maximum 2.4 m diameter. The sphere carries a 1.9 by 1.0 m maneuvering engine. Each weighs approximately 6,300 kg.

Aurora 2 (Satcom C-5)

An Alaskan-owned telecommunications satellite lifted off from Cape Canaveral at 22:55, May 29, aboard a Delta 2. Aurora 2 provides telephone, television, maritime, radio and emergency communications service for the

Aurora

Courtesy GE Astro-Space

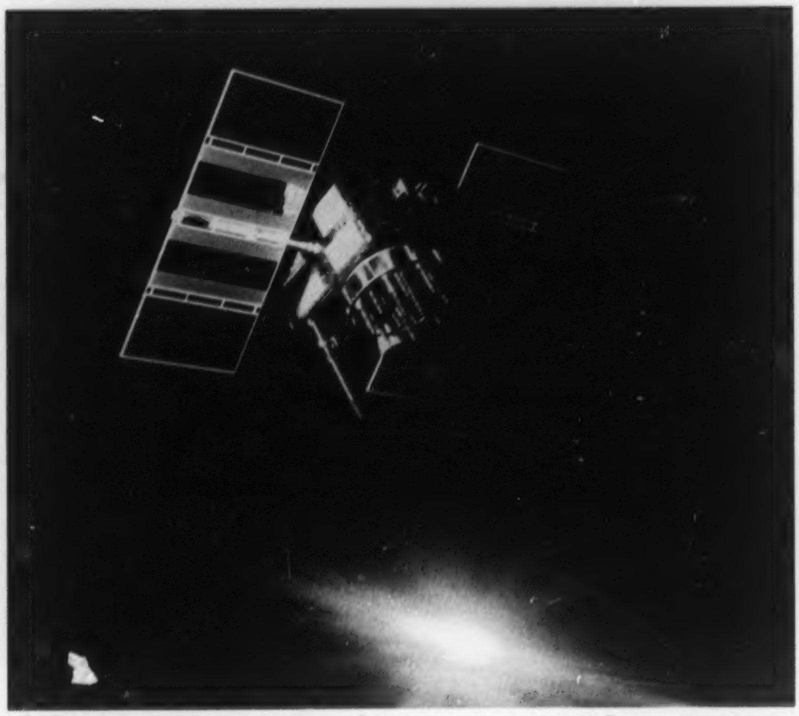
northern state's long distance carrier, Alascom, as well as radio and data services for GE Americom. The satellite carries 32 C-band transponders—24 primary, 6 redundant—operating at 6/4 GHz. Sixteen of the 24 channels serve Alaskan customers; eight serve U.S. business. Built by GE Astro-Space for Alascom, Aurora 2 is box-shaped, measuring 1 by 1.64 by 1.4 m. It weighed 1,336 kg at launch. Two three-panel solar arrays, totalling 13 sq. m, extend from either side of the main body. The fixed dual-polarization reflector antenna covers the continental U.S., Alaska and Hawaii. Aurora 2 replaces Aurora 1, retired after nine years of service. Stationed above 139 deg. w, Aurora 2 became operational in July. It has a 12-year life expectancy.

STS-40

The first shuttle mission dedicated to life sciences began at 13:25, June 5, when Columbia lifted off from Kennedy Space Center Pad 39B. The orbiter also carried 12 Get Away Specials and seven NASA Orbiter Experiments. The STS-40 crew itself was the focal point for the Spacelab Life Sciences (SLS-1) research to determine the causes of space sickness and note physical changes in microgravity conditions. The crew consisted of commander Bryan D. O'Connor; Pilot Sidney M. Gutierrez; Mission Specialists James P. Bagian, Tamara E. Jernigan, Margaret R. Seddon; and Payload Specialists F. Drew Gaffney and Millie Hughes-Fulford. The human crew was accompanied by 29 white rats and 2,500 jellyfish. The orbiter weighed 113,430 kg at liftoff; overall weight was 2,047,143 kg. The astronauts entered the Spacelab module 3 hrs, 44 mns into the flight, kicking off a rigorous work schedule in which they were poked, prodded, spun, weighed, sampled, squeezed and monitored. It was the most concentrated life science research conducted in orbit since Skylab; the crew achieved 140 percent of mission goals. On flight day two, concern was raised that torn insulation in the cargo bay might prevent the doors from closing. That unease was dispelled and a proposed spacewalk to make repairs was not needed. The 9-day, 2-hr, 14-mn mission ended on Edwards AFB runway 22 at 15:39, June 14.

GPS 2 F11

A Navstar Global Positioning System (GPS) satellite, the 11th in the Block 2 series, was Delta 2-launched at 02:32, July 4, from Cape Canaveral. Flight 11 is the 16th operational satellite in the network. A fleet of GPS satellites orbits in six planes at 20,200 km. Each circles the globe every 12 hours, broadcasting a continuous beam of navigation information. Data allows users



GPS

Courtesy Lockheed Space Systems

with GPS receivers to precisely determine their location, speed and time. Positioning data is accurate to 17.8 m for military users; 100 m for civilians. With 16 satellites in service, three-dimensional navigation data is available 17 hours per day. When the constellation of 21 satellites and three on-orbit spares is complete, the system will provide global coverage 24 hours a day. GPS Block 2 is built by Rockwell Space Systems Division for the Air Force. The satellites weigh 1,665 kg at launch, 840 kg on orbit; and measure 5.3 m across with solar panels deployed. The 8-sq-m arrays supply 710 W at end of life. The heart of the Navstar satellites is a set of onboard atomic clocks accurate to within one second every 300,000 years. GPS 2-11 began service August 30. It has a seven-and-a-half-year design life.

ERS 1

The European earth observation satellite, ERS 1, was launched with four small orbiters aboard an Ariane 40, at 01:46, July 17 from Kourou, French Guiana. ERS 1 is the first of two ESA satellites designed to continously monitor ocean surface temperatures, wave and wind activity, ice formation and movement. A near-real-time data stream of some 105 million bits per second will further our understanding of the ocean's interaction with the atmosphere and how it relates to global change. In peripheral missions, the satellite will monitor surface and atmospheric pollution and deforestation. ERS is ESA's largest and most complex effort to date, in terms of hardware flown and data amassed. Its complement of microwave and infrared sensors includes a synthetic aperture radar (SAR) to permit imaging at night and in cloudy weather. Satellite prime contractor was Dornier; the bus, a SPOT derivative, was supplied by Matra. It measures 2 by 2 by 3 m and supports the 12 m by 2.4 m-solar array. The payload platform is about the same size and hosts a 10 by 1-m SAR antenna and three wind scatterometer antennas. Two span 3.6 by 0.25 m, the third is 2.3 by 0.35 m. The power-intensive payload is fed by 1.8 kW at end of life. Stationed in sun-synchronous polar orbit, the 2,384-kg ERS 1 was declared operational December 15 after returning high quality images during check-out. It has a three-year projected life. A follow-on satellite, ERS 2, will carry instruments to monitor global ozone levels.

Uosat 5, Orbcomm-X, Tubsat, SARA

A quartet of small satellites joined ERS 1 aboard an Ariane 40 launch, July 17. The 01:46 liftoff propelled the international payloads—Uosat 5, Orbcomm-X, Tubsat and SARA—into polar orbits. Uosat 5, built by the University of Surrey, is a 50-kg commsat that stores and forwards electronic mail messages. The rectangular craft measures 0.35 by 0.35 by 0.6 m and is topped with a 6-m antenna. Uosat 5 also hosts radiation effects experiments and a CCD camera for 2-km-resolution imaging. Orbcomm-X, built by Orbital Sciences Corporation, is a forerunner of a proposed network of low-earth-orbiting mobile communications satellites. The 22-kg, 0.46 by 0.66 by 0.2-m orbiter is powered by body mounted solar cells generating 27 W. It was flown to evaluate the Orbcomm communications system, explore possible store and forward services and test location determination capability. Initial ground contact with Orbcomm-X indicated the satellite was healthy, but communications were lost following a scheduled shut down of the VHF transmitter. The Technical University of Berlin's Tubsat, another store and forward communications testbed, fared better. The 0.47 by 0.38 by 0.38-m satellite weighs 38-kg and is powered by 10 W. It provides digital data links for small portable transmitters. It also returned data on attitude control and satellite dynamics. The SARA satellite carries a radio astronomy experiment designed to survey radioelectric emissions from Jupiter. The 26-kg satellite is an 0.45-m cube built by the French Club ESIEESPACE. With antennas deployed its height grows to 10 m. During its projected 11-year mission, SARA will supplement information gathered by the Ulysses and Galileo spacecraft.

Pegasus/Microsats

The second flight of the Pegasus air-launched booster delivered seven DoD Microsats into orbit, 17:33, July 17. The winged three-stage vehicle, built by Orbital Sciences Corporation, was carried aloft by a B-52. About one hour after take off from Edwards AFB, the 15-m-long, 1.2-m-diameter, 19,026-kg Pegasus was dropped from the aircraft and its engines ignited. A stage separation malfunction, however, cast the seven-satellite payload into a lower than anticipated orbit. Ground controllers could not make contact with the satellites and it appeared that they were lost. Some nine hours after launch, telemetry was acquired as the Microsats passed over the main control station. Apparently, a new fourth stage guidance system compensated for the separation glitch and modified the trajectory. Subsequent passes verified that all seven satellites were operating. Built by Defense Systems Inc. for the Defense Advanced Research Projects Agency, the 12-sided Microsats measure 19 cm by 48 cm and weigh 22 kg each. They were designed to assess the use of low-earth orbit for global communications. Each satellite operates in UHF, using an analog transponder for FM radio relay of voice communications and a digital transponder to relay data, message, facsimile and modest video traffic. Although the 359 by 457-km orbit fell short of the planned 719 km, the inclination was on target, allowing mission objectives to be met.

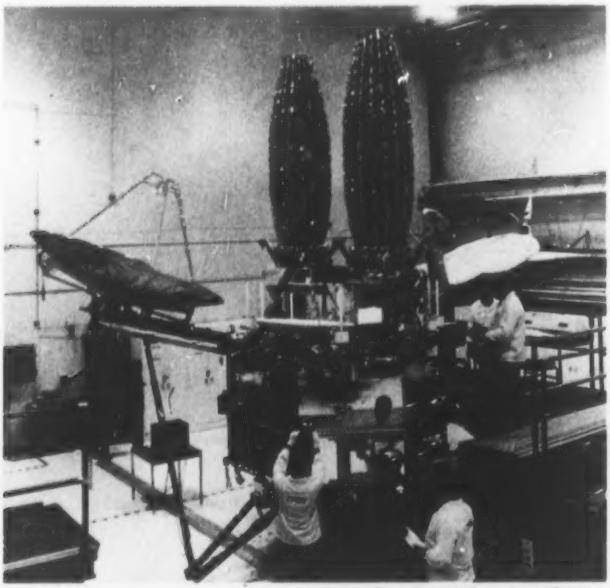
Pegasus

Courtesy Orbital Sciences Corp.

STS-43

The shuttle Atlantis lifted off from Kennedy Space Center Pad 39A, 15:02, August 2, on a mission to deploy a NASA communications satellite and conduct a bevy of scientific experiments. The five-person crew consisted of John E. Blaha, commander; Michael A. Baker, pilot, Shannon W. Lucid, G. David Low and James C. Adamson, mission specialists. The cargo bay held the Tracking and Data Relay Satellite (TDRS), an experimental heat pipe element, an ultraviolet experiment and instruments for optical communications. Eight commercial crystal growth, materials processing, photographic, fluids and microgravity experiments were housed on the middeck. Atlantis and its cargo weighed 117,500 kg at liftoff; total launch weight was 2,050,499 kg. TDRS was dispatched from the cargo bay on orbit five, 6 hrs, 13 mns into the flight. The crew spent the remaining seven days of STS-43 conducting technology experiments and biomedical research. The entire flight from liftoff to landing progressed like virtual clockwork. Atlantis returned to earth on KSC's 15,000-ft concrete runway 15, at 12:23, August 11, to end the 8-day, 21-hr, 21-mn mission. Atlantis logged some 5,915,277 km over 142 orbits.

TDRS 5

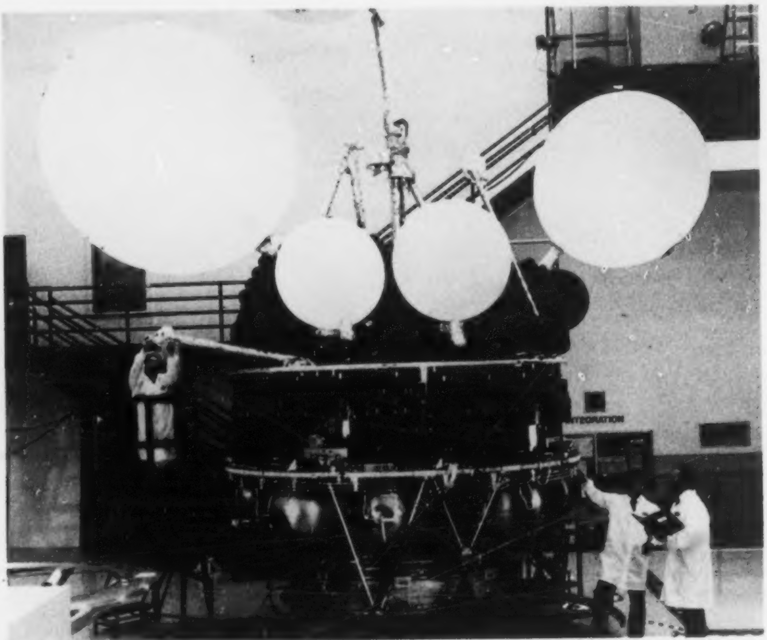


TDRS   TRW Space & Technology

A NASA Tracking and Data Relay Satellite (TDRS 5), joined three sister satellites in geosynchronous orbit following deployment from the shuttle

Atlantis payload bay at 21:15, August 2. The 2,200-kg satellite provides simultaneous service in S-, C- and Ku-bands via seven antennas. TDRS relays voice, TV, digital and analog signals from the shuttle and other low-earth orbiters to a dedicated ground station. Because a TDRS, unlike NASA's ground network, is almost always in range of a user satellite, communications coverage increases from about 15 percent to more than 85 percent of a given satellite's orbit. In the shuttle's case, this added coverage has supported on-orbit repairs, live TV broadcasts and continuous crew-to-ground-control dialogue during reentry. Twelve C-band channels are available for commercial service. TDRS is built by TRW Space and Technology Group for NASA Goddard. It measures 17.4 by 12.9 by 12.9 m with solar arrays and two 4.9-m dish antennas deployed. The satellite is powered by 1,850 W at the end of its projected 10-year life. TDRS 5 commenced operation in October after a nine-week checkout. Now stationed above 174 deg. w, it replaces TDRS-3, which will serve as an on-orbit spare at 62 deg. w. TDRS 4, located above 41 deg. w, is the system's second operational satellite. TDRS 1 is positioned above 171 deg. w to meet the increased demands of shuttle missions.

Intelsat 6 F5, F1

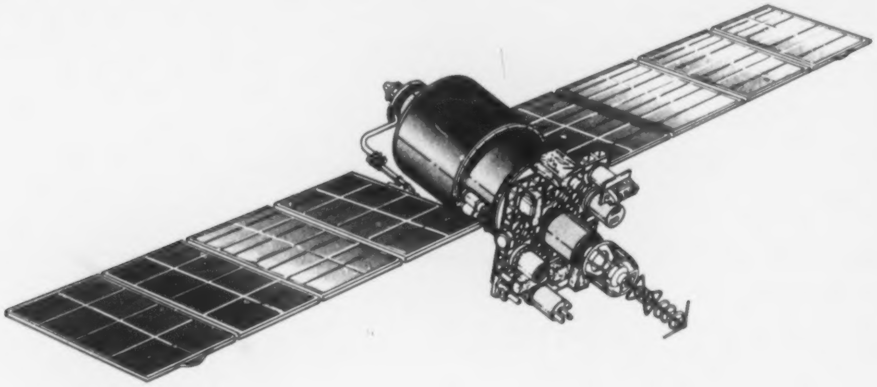


Intelsat Courtesy Hughes Space & Communications

The final two flights in the Intelsat 6 series of international communications satellites were launched via Ariane 44Ls, the largest boosters in the series, from Kourou, French Guiana. F5 lifted off at at 23:15, August 14; F1 at 23:08, October 29. The satellites, owned by the 121-member International Telecommunications Satellite Organization (INTELSAT), carry 38 C-band and 10 K-band transponders providing telephone, TV and data service to large ground stations and small terminals. Each satellite can handle 120,000 telephone calls and three color TV broadcasts simultaneously. The massive commsats, built by Hughes Space and Communications Group, stand 11.7 m tall, 3.6 m in diameter. Body mounted solar cells generate 2,250 W at end of life. F5 weighed 4,296 kg at launch; F1, 4,330 kg. Both have 10-year design lives, but are expected to achieve 14 years of service. F5, stationed above 24.5 deg. w, took over the transmission service of Intelsat 6 F2 on October 17. F2 was subsequently moved to 60 deg. e. F1 is stationed above 27.5 deg. w., replacing F4 which moved to 63 deg. e.

Meteor 3 F5

A Soviet Meteor 3 weather satellite hosting a U.S.-built science instrument lifted off from Plesetsk aboard a Tsyklon (SL-14) booster at 09:15, August 15. The flight stems from a 1988 U.S./ USSR agreement on space cooperation and a subsequent pact between the Soviet Hydromet and NASA in 1990. NASA's Total Ozone Mapping Spectrometer (TOMS), identical to an instrument flown on Nimbus 7 in 1978, provides high resolution data on global ozone. The Meteor 3 flight was timed to monitor ozone depletion over Antarctica, an event that usually occurs in the Fall. Meteor 3 F5 is a third-generation meteorological satellite that also carries a scanning



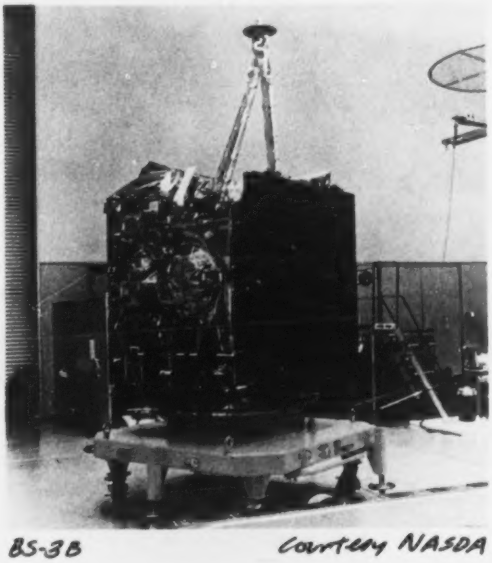
meteor 3

Courtesy Teledyne-Brown

telephotometer, infrared radiometer, infrared spectrometer and multispectral ultraviolet spectrometer to collect weather imagery and data. Built by the All Union Research Institute for Electro Mechanics (VNIIEM), it is a 4.2-m-long by 1.4-m-diameter cylinder, weighing 2,215 kg at launch. Despite political turmoil within the Soviet Union, the cooperative venture has gone smoothly. The mission is expected to continue for two years. Meteor 3 F5 was the second of the series flown in 1991. Meteor 3 F4 was launched 01:39, April 24.

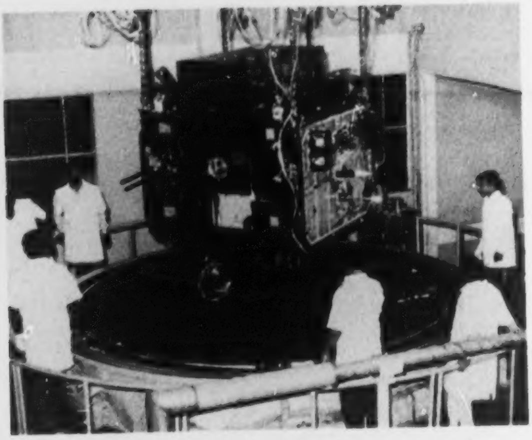
BS-3B

Boosting a sagging satellite broadcasting capacity weakened by two launch failures and malfunctions aboard existing commsats, Japan's BS-3B soared into orbit aboard an H-1 from Tanegashima Space Center, August 25 at 08:40. The satellite is equipped with three 120 W transponders operating at 12/14 GHz for direct-to-home TV broadcast. Two transponders are used by the Japanese national broadcasting network, Nippon Hoso Kyokai (NHK), the other by privately owned Japan Satellite Broadcasting Co. BS-3B also hosts a fully redundant backup channel, and a 20-W wideband transponder for experimental transmissions of high definition TV. Manufactured by Nippon Electric Co. (NEC), the satellite is based on GE's Satcom 3000 bus. It measures 1.3 by 1.6 by 1.6 m, with solar arrays spanning 15 m tip to tip. Sixteen thousand solar cells provide 1,093 W at end of life. It weighed 1,115 kg at launch; 550 kg on orbit. Once in space, the satellite's name was changed to Yuri 3B (Lily). Now operational above 110 deg. e, it has a seven to nine-year life expectancy.



BS-3B Courtesy NASDA

IRS-1B



IRS

India's second remote sensing satellite was launched by a Soviet Vostok booster (A-1), 06:48, August 29, from the Baikonur Cosmodrome (Tyuratam). It was the second time India had purchased commercial launch services from the USSR. IRS-1B carries three imaging sensors to map Indian terrain. Data is used for resource management and contributes to meteorology, agriculture, mineral exploration, community planning, crop forecasting and pest control. The Linear Imaging Self-scanning Sensor (LISS) I covers a 148-km slice of land and has a spatial resolution of 72.5 m. LISS IIA and IIB work in tandem to cover a 145-km swath; each has 36.2 m resolution. The satellite is one of four developed by the Indian Space Research Organization. It is box-shaped and is flanked by solar panels with 8.5 sq. m of cell area. Generated power is 620 W at end of life. IRS-1B weighed 980 kg at launch. Cast into sun-synchronous polar orbit, it scans all of India every 22 days. The satellite was declared operational September 16 and replaces the soon-to-be-retired IRS-1A. IRS-1C and ID are scheduled for launch aboard Soviet vehicles in 1993 and 1996.

Solar A

A Japanese solar observation satellite lifted off from Kagoshima aboard an MU-3S-2, at approximately 02:24, August 30. The satellite carries four instruments developed by Japanese, U.S. and British researchers to study solar flares and the sun's corona. It is the first solar explorer to host both soft and hard X-ray telescopes. The soft X-ray telescope uses low level X-rays to create images and was supplied by NASA Marshall Space Flight Center. The Japanese hard X-ray telescope produces images using stronger radiation. Solar A is also equipped with a Bragg crystal spectrometer provided by the United Kingdom, and a Japan-built wide-band spectrometer. The project is

Soft-x-ray solar image　　Courtesy ISAS

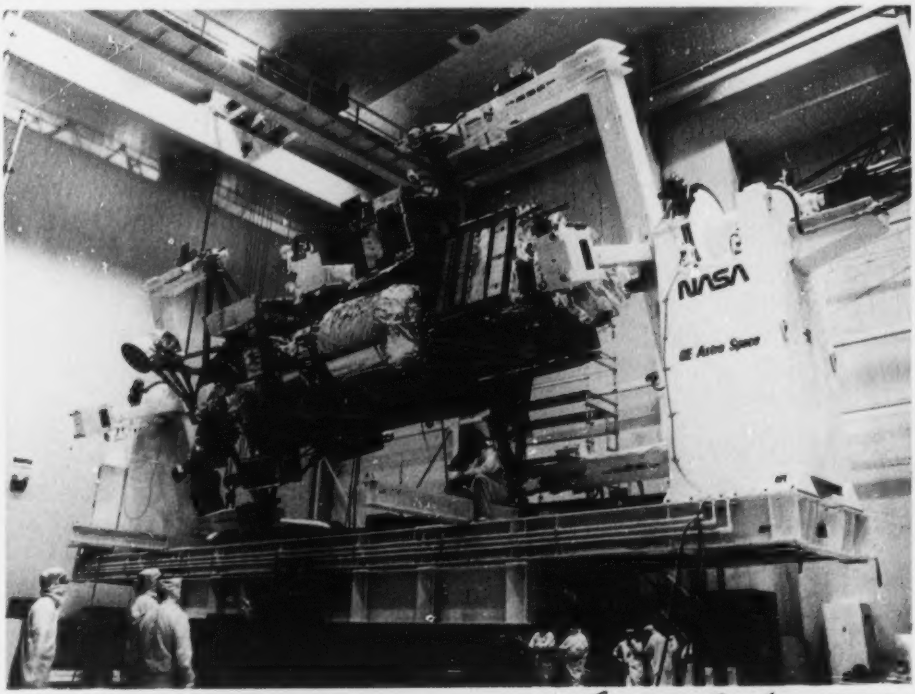
sponsored by Japan's Institute of Space and Astronautical Science (ISAS). The satellite is rectangular, approximately 1.4 m wide and 2 m high and weighed 420 kg at launch. Solar A was renamed Yohkoh, or "sunbeam," once on orbit. Shortly after being activated in September, it began returning high resolution solar images — more than 100,000 by year end. Yohkoh was declared fully operational in October and has a two to three-year life expectancy.

STS-48

A shuttle mission to deploy the first major element of NASA's Mission to Planet Earth program commenced 23:11, September 12, with Discovery's liftoff from Kennedy Space Center Pad 39A. The night launch was mandated by the precise release time required by the Upper Atmosphere Research Satellite (UARS). The orbiter was inserted into a 57 deg. polar orbit to place UARS onto a flight path that will give it a global view of the stratosphere and mesosphere. Discovery also hosted 11 cargo bay and middeck experiments and a five-person crew consisting of Commander John O. Creighton; Pilot Ken S. Reightler; Mission Specialists Charles D. Gemar, James F. Buchli, and Mark N. Brown. Orbiter/cargo weight at launch was 108,599 kg; overall weight was 2,041,828 kg. UARS was released from the robotic arm at 04:23, September 15, after a short delay caused when a faulty transponder disrupted communications with the Tracking and Data Relay Satellite. On flight day four, Discovery maneuvered to avoid a derelict Soviet booster that would have passed within 2 km of the orbiter. It was the first time such evasive action was necessary. A planned night landing at KSC was aborted due to ominous clouds. Instead, STS-48 ended on Edwards AFB runway 22 at 07:39, September 18. Discovery's 13th flight, the most for any shuttle to date, lasted 5 days, 8 hrs, 28 mns.

Upper Atmosphere Research Satellite (UARS)

The first in a series of NASA environmental monitoring satellites was lofted aboard Discovery at 23:11, September 12. The 6,795-kg Upper Atmosphere Research Satellite (UARS) was deployed into a non-sun-synchronous polar orbit 52 hrs later (See STS-48). Prior to UARS release, the shuttle boosted its altitude to give the satellite an extra lift towards a longer orbital life. Three UARS thruster burns raised it to its operational altitude. UARS is making the first comprehensive studies of the stratosphere and returning data on the mesosphere and thermosphere. Findings will offer insight into the dynamics



UARS

Courtesy GE Astro-Space

of the highest atmospheric layers and are targeted to help predict ozone depletion. Nine instruments are measuring atmospheric temperature and chemistry, mapping high altitude winds, tracking solar energy input, and measuring earth's magnetic field. A tenth instrument is monitoring solar energy for climatic change studies. UARS was designed and built by GE Astro-Space for Goddard Space Flight Center. It measures 9.7 m long by 4.5 m in diameter. Six 1.5-m by 3.3-m solar panels supply 1,600 W. UARS' 36-month mission began in early November. Data from the craft's Microwave Limb Sounder has produced a three-dimensional map of the ozone layer and a global view of chlorine monoxide. The maps confirm previous studies showing that chlorine atoms freed from chlorofluorocarbons destroy ozone.

STS-44

An early warning satellite joined a six-person crew aboard the 23:44, November 24, liftoff of the shuttle Atlantis from Kennedy Space Center Pad 39A. It was the first time a Defense Support Program (DSP) satellite had flown on the shuttle and the first unclassified launch in the 20-year-old DoD program. The orbiter and its cargo weighed 117,612 kg; total launch weight was 2,050,401 kg. The shuttle's ninth military mission was commanded by Frederick D. Gregory and piloted by Terence T. Henricks. James S. Voss, F. Story Musgrave and Mario Runco, Jr. were mission specialists. Tom Hennen flew as a payload specialist under a Military Man in Space experiment to evaluate manned reconnaissance from orbit. DSP was deployed 6 hrs, 19 mns after the nighttime liftoff. The remainder of the flight was devoted to medical experiments, and photo and telescopic observations of predetermined maritime and land targets. On mission day four, Atlantis lowered its altitude to prevent a derelict rocket body from entering its 2-km safety zone. The shuttle missed it by some 32 km. It was the second shuttle mission in a row that had to maneuver to avoid space debris. The 10-day mission was cut short by a navigation unit failure, and the landing rerouted from KSC to Edwards AFB. STS-44 ended on the new runway 5, at 22:35, December 1. To test the properties of the new runway, Atlantis coasted to a stop without braking. The resulting roll-out was almost 5 km long. Mission duration was 6 days, 22 hrs, 51 mns.

Defense Support Program

The first unclassified launch of a Defense Support Program (DSP) satellite commenced November 24 with the shuttle Atlantis liftoff from Kennedy Space Center. The 2,355-kg early warning satellite was deployed from the

Dsp

TRW Space & Technology

shuttle cargo bay six hours after liftoff at 06:03, November 25. Immediately after deployment the mission was again classified. DSP satellites, built by TRW Space and Technology Group for the Air Force Space Systems Division, serve as the spaceborne segment of NORAD's Tactical Warning and Attack Assessment System. Using infrared detectors that sense the heat from missile plumes against the earth background, they detect, characterize and report ballistic missile launches. The sensors, built by Aerojet Electronic Systems Division, also scan the earth for nuclear detonations. The DSP series of satellites contributed to the Persian Gulf war effort, alerting U.S. and coalition forces of Scud missile launches.

DMSP 11

DMSP

Courtesy GE Astro-space

A military weather satellite, part of the Defense Meteorological Satellite Program, was launched aboard an Atlas E from Vandenberg AFB, November 28 at 13:23. Placed in near-polar orbit, the satellite scans the earth to provide cloud cover, earth imagery and atmospheric data to DoD users worldwide. Weather data is also available to civil users through the National Oceanic and Atmospheric Administration. DMSP Flight 11 is the fifth in a series of Block 5-D2 satellites built by GE Astro-Space for the Air Force. The 830-kg satellite is approximately 3.64 m long by 1.21 m in diameter. It carries eight meteorological sensors including an Operational Linescan System to capture cloud pattern images. The Air Force keeps two operational DMSPs in orbit at all times. Flight 11 replaces DMSP-8, launched in 1987. Like its predecessors, it has a four-year design life.

Telecom 2A

A second-generation French satellite providing commercial and military communications service was dual-launched with Inmarsat 2 F3 aboard an Ariane 44L, 23:19, December 16. Telecom 2A supplies telephone, TV and data transmissions via 10 C-band and 11 ku-band transponders. C-band serves French overseas territories; Ku-band targets domestic France. Both transmission bands are backed with four redundant transponders each. A

Syracuse Communications package supplies secure links for government and military use over five super high frequency X-band channels, with 3 for 2 redundancy. The communications payload is built by Alcatel Espace; the satellite by Matra Marconi Espace for France Telecom and the French Ministry of Defense. Telecom 2A is the first of three follow-on satellites to the Telecom 1 series. It is box-shaped, measuring 2.1 by 1.9 by 2.6 m. Solar arrays supplying 2,450 W at end of life span 22 m. Telecom 2A weighed 2,275 kg at launch, 1,380 kg on orbit. It has a 10-year minimum life expectancy and is in service over 3 deg. e.

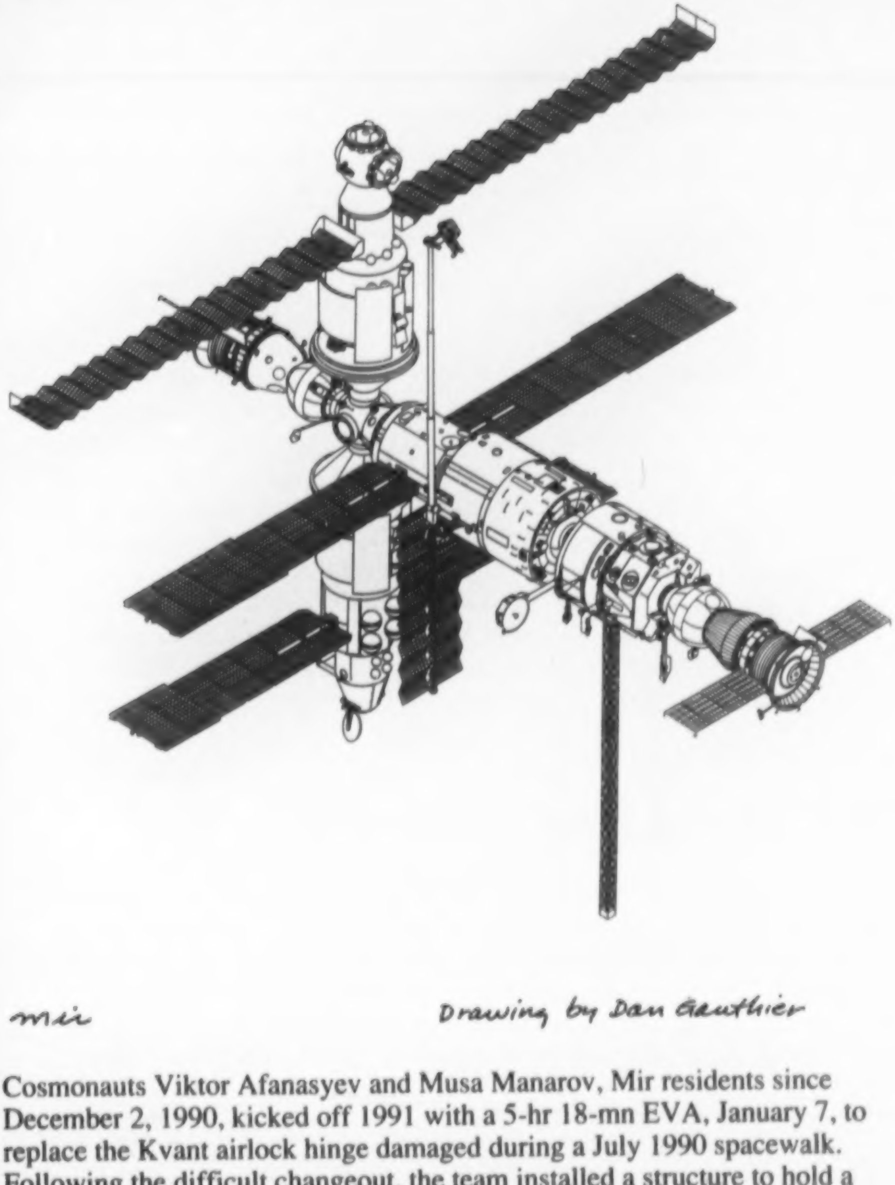
Interkosmos 25/Magion 3

The lone dedicated Soviet science mission of the year lifted off from Plesetsk aboard a Tsyklon (SL-14) booster at 04:03, December 18. Interkosmos 25 is part of the Apex (Active Plasma Experiment) program to investigate the effects of streams of electrons and beams of plasma on the ionosphere and magnetosphere. The spacecraft is cylindrical, measuring 1.8 m long, 1.5 m in diameter. Eight solar panels extend in petal-like fashion from one end. It weighed about one metric ton at launch. A Czechoslovakian subsatellite, Magion 3, was deployed from Interkosmos 25, December 28. The 52-kg minisat measured electron and ion beams in tandem with its host as the distance between the two craft varied. Magion 3 is a 56-cm-high by 1.7-m-diameter cylinder.

PRC 34 (Shiyong Tongbu Tongxin Weixing 5)

A Chinese domestic communications satellite was stranded in an unusable orbit when the CZ-3 launch vehicle's third stage failed 135 seconds after ignition. The 12:02 liftoff from Xi Chang on December 28 placed the satellite into a satisfactory parking orbit; the subsequent boost to transfer orbit failed. The following day, the satellite's apogee kick motor raised its flight path, allowing it to perform limited communications work from a highly elliptical orbit. Shiyong Tongbu Tongxin Weixing, or Operational Geostationary Communications Satellite, is part of the Chinese Dong Fang Hong 2 series. It is cylindrical, measuring about 2 m in diameter and 2.4 m high. It weighed approximately 1,025 kg at launch. The third stage failure is not expected to affect the scheduled 1992 launches of two Australian payloads. Those satellites will fly on the CZ-2E booster which does not use the engine that failed.

Mir 1991



mir

Drawing by Dan Gauthier

Cosmonauts Viktor Afanasyev and Musa Manarov, Mir residents since December 2, 1990, kicked off 1991 with a 5-hr 18-mn EVA, January 7, to replace the Kvant airlock hinge damaged during a July 1990 spacewalk. Following the difficult changeout, the team installed a structure to hold a crane needed to help relocate solar panels from the Kristall module to Kvant 1. Kristall is slated to be moved to another port and the arrays would impede existing panels if they stayed in that configuration. The crane itself, a rotating telescopic arm, was installed during a 5-hr 33-mn EVA, January 23. Three days later, the cosmonauts made further preparations for the solar array transfer; that EVA lasted 6 hrs 22 mns. The scheduled March 21 arrival of Progress M-7 was delayed a week by its inability to dock with the station.

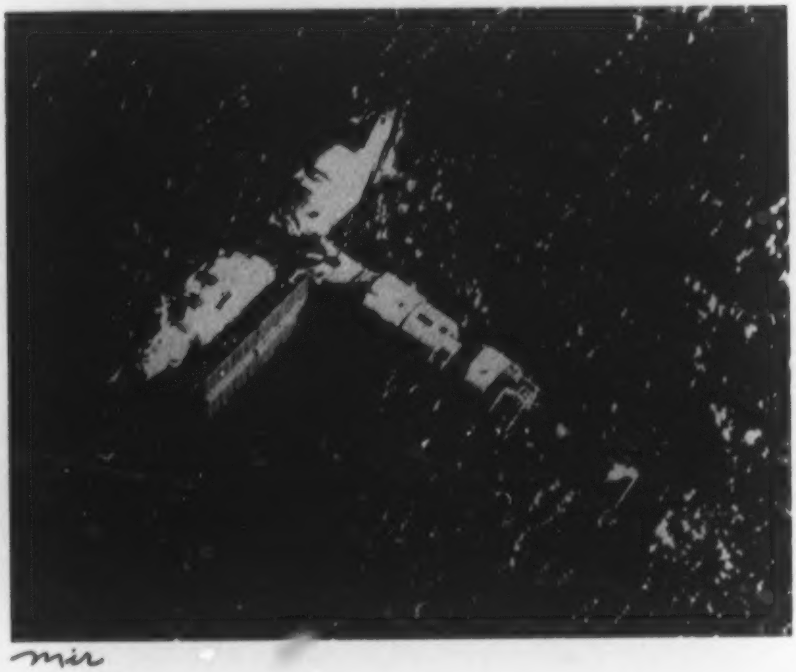
Two attempts were aborted when the cargo craft veered off course. On March 26, the crew flew Soyuz TM-11 around Mir to see if it could dock automatically at the problem Kvant port. They, too, strayed off course. The trouble was traced to an antenna, apparently damaged during an EVA. The duo manually docked TM-11 at the Kvant port, leaving the forward port open for Progress M-7. It mated with Mir March 28. During a subsequent 3-hr 34-mn EVA, April 25, the pair verified the antenna prognosis. Following the arrival of the Soyuz TM-12 crew, Afanasyev and Manarov returned to earth May 26. They landed in Kazakhstan at 10:04, ending a 175-day, 1-hr, 52-mn stay in orbit. The flight gave Manarov a total 541 days in space, a new record.

Soyuz TM-12

British cosmonaut Helen Sharman joined Anatoli Artsebarski and Sergei Krikalev aboard Soyuz TM-12, lifting off from Tyuratam at 12:50, May 18. Sharman, the first woman to visit the station, conducted medical experiments on behalf of her Soviet hosts. She also took pictures and made radio contact with British schoolchildren. Her 7-day, 21-hr, 14-mn mission ended May 26, when she returned to earth with the TM-11 crew. Artsebarski and Krikalev settled into the Mir regimen of experiments and maintenance. An atmospheric research subsatellite released June 17 failed when its antenna did not deploy. A balloon deployment, August 15, also failed. During six EVAs, taking place between June 25 and July 27, the cosmonauts installed outdoor experiments, retrieved others, repaired the Kvant docking antenna and erected a 14-m platform to host an attitude control thruster for the growing station. Total time outside Mir was 31 hrs, 58 mns. While Artsebarski and Krikalev orbited earth, their homeland suffered a failed coup d'etat and political turmoil that would lead to the breakup of the Soviet Union. Mir activities, however, proceeded normally; Progress M-9 was launched on schedule, August 20th. The cosmonauts were more affected by a decision made a month earlier to combine two upcoming Mir flights into one. The shuffle bumped Krikalev's replacement, requiring him to spend five more months in space. Soyuz TM-13, bringing Artsebarski's relief, arrived October 4. He returned to earth October 10, landing at 04:12. His flight time was 144 days, 15 hrs, 22 mns.

Soyuz TM-13

A crew representing Austria, the Republic of Kazakhstan and the Soviet states, was lofted to Mir aboard Soyuz TM-13, at 05:59, October 2. Austrian Franz Viehbock and Kazakh Toktar Aubakirov were paying passengers. Aubakirov, from the home of the Tyuratam launch site, was the first commercial cosmonaut from inside the USSR. Commander Aleksander Volkov, a Ukrainian living in Moscow, would reside on Mir for the next few months. Viehbock and Aubakirov spent their six-day visit completing a rigorous slate of medical, biological and technical experiments. Each also made photo surveys of their respective lands. The researchers returned to earth October 10, joining Anatoli Artsebarski aboard Soyuz TM-12. Both had logged 7 days, 22 hrs, 13 mns in space. Volkov remained at Mir with veteran Sergei Krikalev. On October 15, the team tested the Kvant port docking antenna during a 1-hr, 44-mn flight around the station aboard TM-13. Progress M-10 arrived October 21, docking two days after an initial rendezvous was aborted by a computer malfunction. In contrast to the daily upheavals that were shattering the Soviet Union, the Mir flight remained markedly routine. The cosmonauts devoted their working hours to astrophysical and geophysical experiments, medical studies and smelting operations. They are scheduled to be relieved by the Soyuz TM-14 crew in March 1992.



mir

Interplanetary Updates

The **Ulysses** solar explorer reached the halfway point to Jupiter, some 398 km from earth, April 14. During its February 1992 flyby, Ulysses will use the giant planet's gravity to kick it out of the ecliptic and onto a trajectory that will take it around the sun's poles. In July, controllers at the Jet Propulsion Laboratory fired the spacecraft's thrusters, making a final trajectory correction to align it with Jupiter. In August, Ulysses passed behind the sun, giving scientists the opportunity to study the solar atmosphere. With Ulysses and earth on opposite sides of the sun, radio waves transmitted from the craft travelled through the inner region of the corona. The solar corona experiment looked at atmospheric density, speed and turbulance. At year end, Ulysses was approaching Jupiter at some 10 million km per week. It is due at the sun's south polar region in June 1994. The five-year mission is managed by NASA's Office of Space Science and Applications and the European Space Agency.

Venus — Courtesy JPL

Magellan's planned 243-day mission to map the surface of Venus came to a successful end May 15. With 84 percent of the planet revealed to researchers via Magellan's 120-m resolution radar imagery and the spacecraft operating in excellent health, a second mapping cycle was authorized to begin as soon as the first one ended. The second sweep captured the remaining 16 percent of the surface, including the never-before-seen south pole. Radar maps have shown Venus' surface to be relatively young, with features evolving via volcanic and tectonic forces — much like the young earth. The planet's geology is alive, replete with active volcanos and rock slides. The origins of a 6,760-km-long channel, the longest known in the solar system, remain a mystery. The second cycle concluded January 15, 1992. Magellan is expected to operate through 1995, allowing for five more mapping passes.

The **Galileo** probe and the asteroid Gaspra flew within 1,600 km of each other during the first-ever asteroid flyby October 29. The encounter, a side trip on Galileo's six-year flight to a 1995 rendezvous with Jupiter, took place some 408 km from earth. Images of the 19 x 13 x 11-km asteroid, taken from about 16,200 km, were dispatched in November. The rest of the data will be retrieved just prior to a December 1992 earth flyby. The data delay is a result of an antenna glitch that threatens the larger mission. Because the 4.9-m high-gain antenna has not fully opened, the low-gain antenna bears the transmission burden. Data rates are lower and slower. Controllers at the Jet Propulsion Laboratory are trying to unstick the antenna before Galileo's two-year Jupiter mission begins. Without it, most of the imagery and data will be lost. The problem arose April 11 when the antenna was commanded to deploy to support the Gaspra flyby. Several of its 18 graphite epoxy ribs did not fully open. They are apparently impeded by slightly misshapen titanium pins. Four attempts to deploy the balky antenna failed. The first try in May came after it was warmed by the sun. Unfurling efforts in July, August and December followed cold soaks. Controllers believe that continued warm/cold cycles may work; attempts to free the antenna will continue. By year end, Galileo was 482 million km from earth.

Gaspra Courtesy JPL

Venus

Courtesy JPL

Worldwide record of known successful U.S. launches

International payloads
are listed when launched
by U.S. booster

Classified U.S. payloads are
listed by launch vehicle

*Payload(s) injected into orbit

Vanguard TV 3

*Successes: 0
Failures: 1
Total: 1

1957

Score
Pioneer 3
Pioneer 1
Explorer 4
Explorer 3
Vanguard 1
Explorer 1

Pioneer 2
Beacon 1
Vanguard SLV 3
Explorer 5
Able 1
Vanguard SLV 2
Vanguard SLV 1
Vanguard TV 5
Explorer 2
Vanguard TV 3A

*Successes: 7
Failures: 10
Total: 17

1958

Discoverer 8
Discoverer 7
Explorer 7
Vanguard 3
Discoverer 6
Discoverer 5
Explorer 6
Discoverer 2
Pioneer 4
Discoverer 1
Vanguard 2

Atlas-Able 4
Transit 1A
Beacon 2
Explorer S-1
Discoverer 4
Vanguard SLV 6
Discoverer 3
Vanguard SLV 5

*Successes: 11
Failures: 8
Total: 19

1959

Discoverer 19
Discoverer 18
Tiros 2
Discoverer 17
Explorer 8
Courier 1B
Discoverer 15
Discoverer 14
Echo 1
Discoverer 13
Transit 2A
Midas 2
Discoverer 11
Transit 1B
Tiros 1
Pioneer 5

Atlas-Able 5B
Explorer S-56
Transit 3A
Discoverer 16
Samos 1
Atlas-Able 5A
Courier 1A
Discoverer 12
Echo A 10
Explorer S-46
Midas 1
Discoverer 10
Discoverer 9

*Successes: 16
Failures: 13
Total: 29

1960

Atlas-Agena B
Discoverer 36
Mercury-Atlas 5
Ranger 2
Transit 4B
Discoverer 35
Discoverer 34
Midas 4
Discoverer 32
Discoverer 31
Mercury-Atlas 4
Discoverer 30
Discoverer 29
Explorer 13
Ranger 1
Explorer 12
Midas 3
Tiros 3
Discoverer 26
Transit 4A
Discoverer 25
Explorer 11
Discoverer 23
Explorer 10
Transit 3B
Discoverer 21
Discoverer 20
Explorer 9
Samos 2

Atlas-Agena B
Mercury-Scout 1
Discoverer 33
Samos 3
Discoverer 28
Discoverer 27
Explorer S-55
Discoverer 24
Explorer S-45A
Mercury-Atlas 3
Discoverer 22
Explorer S-45

*Successes: 29
Failures: 12
Total: 41

1961

Transit 5A
Explorer 16
Thor-Agena D
Relay 1
Thor-Agena D
Thor-Agena D
Thor-Agena B
Atlas-Agena B
Thor-Agena B
Anna 1B
Explorer 15
Starad
Ranger 5
Thor-Agena B
Mercury-Atlas 8
Explorer 14
Thor-Agena D
Alouette 1
Tiros 6
Thor-Agena B
Thor-Agena B
Thor-Agena D
Mariner 2
Scout
Atlas-Agena B
Thor-Agena D
Thor-Agena B
Thor-Agena B
Atlas-Agena B
Telstar 1
Thor-Agena D
Thor-Agena B
Tiros 5
Thor-Agena B
Atlas-Agena B
Thor-Agena B
Thor-Agena B
Mercury-Atlas 7
Thor-Agena B
Thor-Agena B
Atlas-Agena B
Ariel 1
Ranger 4
Thor-Agena B
Atlas-Agena B
Atlas-Agena B
OSO 1
Discoverer 38
Thor-Agena B
Mercury-Atlas 6
Tiros 4
Ranger 3

Atlas-Agena B
Mariner 1
Scout
Anna 1A
Solrad 4B
Composite 1
Discoverer 37

*Successes: 52
Failures: 7
Total: 59

1962

TAT-Agena D
Tiros 8
Explorer 19
Atlas-Agena D
Thor-Able Star
Thor-Agena D
Atlas-Centaur 2
Explorer 18
TAT-Agena D
Atlas-Agena D
Vela 1 & 2
Thor-Able Star
TAT-Agena D
Atlas-Agena D
Thor-Agena D
TAT-Agena D
TAT-Agena D
Syncom 2
Atlas-Agena B
Thor-Agena D
Atlas-Agena D
TAT-Agena B
Geophysical
Research
Satellite
TAT-Agena D
Tiros 7
Scout
Thor-Agena D
TAT-Agena D
TAT-Agena D
Mercury-Atlas 9
Atlas-Agena B
Telstar 2
Explorer 17
Thor-Agena D
Scout
Syncom 1
Thor-Agena D
Thor-Agena D

Thor-Agena D
Scout
Atlas-Agena B
Thor-Agena D
Scout
Scout
TAT-Agena D
TAT-Agena D

*Successes: 38
Failures: 8
Total: 46

1963

TAT-Agena D
Explorer 26
TAT-Agena D
San Marco 1
Thor-Able Star
Atlas-Centaur 4
Transtage
Atlas-Agena D
Mariner 4
Explorer 24 & 25
TAT-Agena D
Explorer 23
Mariner 3
TAT-Agena D
TAT-Agena D
Atlas-Agena D
TAT-Agena D
Explorer 22
Thor-Able Star
TAT-Agena D
Explorer 21
Atlas-Agena D
Saturn SA-7
TAT-Agena D
OGO 1
Nimbus 1
Explorer 20
TAT-Agena D
Syncom 3
Atlas-Agena D
TAT-Agena D
Ranger 7
Vela 3 & 4
TAT-Agena D
Atlas-Agena D
TAT-Agena D
TAT-Agena D
Thor-Agena D
TAT-Agena D
TAT-Agena D
Scout
Saturn SA-6
Atlas-Agena D
TAT-Agena D
Atlas-Agena D
Gemini-Titan 1
Ariel 2
Atlas-Agena D
TAT-Agena D
Atlas-Agena D
TAT-Agena D
Ranger 6
Saturn SA 5
Echo 2
Relay 2
Thor-Agena D
TAT-Agena D

Atlas-Agena D
Titan IIIA
Atlas-Centaur
Environmental
Sciences
Research
Satellite
Thor-Able Star
TAT-Agena D
Beacon-Explorer A

*Successes: 57
Failures: 7
Total: 64

1964

TAT-Agena D
Scout
LES 3, 4 et. al.
Pioneer 6
Gemini 6
TAT-Agena D
FR 1
Gemini 7
Alouette 2 et. al.
Explorer 30
Atlas-Agena D
Explorer 29
TAT-Agena D
OV2 1, LCS 2
OGO 2
TAT-Agena D
OV1 2
Atlas-Agena D
TAT-Agena D
Thor-Altair
Gemini 5
TAT-Agena D
Surcal et. al.
Atlas-Agena D
Secor 5
Atlas-Agena D
Pegasus 3
Vela 5 & 6
TAT-Agena D
TAT-Agena D
Tiros 10
Atlas-Agena D
Thor-Able Star
Titan IIIC
TAT-Agena D
Gemini 4
Explorer 28
Atlas-Agena D
Pegasus 2
Thor-Altair
TAT-Agena D
LES 2, ECS 1
TAT-Agena D
Explorer 27
Atlas-Agena D
Early Bird
Snapshot
TAT-Agena D
Gemini 3
Ranger 9
Thor-Altair
Atlas-Agena D
Thor-Able Star
GGS 2 & 3 et. al.
TAT-Agena D
Ranger 8
Pegasus 1
LES 1
OSO 2
Atlas-Agena D
Tiros 9
Thor-Altair
TAT-Agena D

Gemini 6 Target
Thor-Agena D
OSO C
Atlas-Agena D
OV1 3
Atlas-Centaur
OV1 1

*Successes: 63
Failures: 7
Total: 70

1965

TAT-Agena D
Biosatellite 1
Titan IIIB-Agena D
OV1 9 & 10
ATS 1
Atlas-Agena D
Gemini 12
Gemini 12 Target
TAT-Agena D
Lunar Orbiter 2
OV4 3 et. al.
Atlas-Agena D
OV3 2
Atlas-Centaur 9
Intelsat IIA
Atlas-Agena D
EGRS-8
ESSA 3
Titan IIIB-Agena D
TAT-Agena D
Surveyor 2
Atlas-Agena D
Thor-Burner II
Gemini 11
Gemini 11 Target
ERS 15
Scout
Pioneer 7
Atlas-Agena D
Lunar Orbiter 1
Thorad-Agena D
OV3 3
Titan IIIB-Agena D
Gemini 10
Gemini 10 Target
OV1 8
Atlas-Agena D
Saturn 1
Explorer 33
Pageos
TAT-Agena D
IDCSP 1-7, GGTS 1
OV3 4
Secor 6, ERS 16
OGO 3
Atlas-Agena D
Gemini 9
Gemini 9, Target B
Surveyor 1
Explorer 32
TAT-Agena D
Scout
Nimbus 2
Atlas-Agena D
OV3 1
Atlas-Agena D
OAO 1
Atlas-Centaur
TAT-Agena D
Thor-Altair
OV1 4 & 5
Scout
Atlas-Agena D
Gemini 8
Gemini 8 Target
TAT-Agena D
ESSA-2
Atlas-Agena D
TAT-Agena D
ESSA 1
TAT-Agena D
Scout
Atlas-Agena D

IDCSP (8 satcoms)
Gemini 9 Target A
TAT-Agena D
Thor-Altair

*Successes: 73
Failures: 4
Total: 77

1966

Pioneer 8
LTTAT-Agena D
Titan IIIB-Agena D
OV3 6
ESSA 6
Apollo 4
Surveyor 6
ATS 3
LLTAT-Agena D
Titan IIIB-Agena D
OSO 4
Thor-Burner II
Intelsat IID
Scout
Titan IIIB-Agena D
LTTAT-Agena D
Surveyor 5
Biosatellite 2
Thor-Burner II
Titan IIIB-Agena D
LTTAT-Agena D
Lunar Orbiter 5
OGO 4
OV1 12 & 86
TAT-Agena D
Explorer 35
Surveyor 4
IDCSP 16-18 et. al.
Secor 9, Aurora 1
Titan IIIB-Agena D
LTTAT-Agena D
Mariner 5
Atlas-Agena D
GGSE 4, 5 et. al.
Explorer 34
Atlas-Agena D
Scout
LTTAT-Agena D
Ariel 3
Lunar Orbiter 4
Vela 7, 8 et. al.
San Marco 2
ESSA 5
Surveyor 3
Scout
ATS 2
TAT-Agena D
Intelsat IIC
OSO 3
Titan IIIB-Agena D
TAT-Agena D
Thor-Burner II
Lunar Orbiter 3
Atlas-Agena D
ESSA 4
IDCSP 8-15
TAT-Agena D
Intelsat IIB

ESRO 2A
Titan IIIB-Agena D
OV3 5

*Successes: 58
Failures: 3
Total: 61

1967

Apollo 8
Intelsat IIIB
ESSA 8
LTTAT-Agena D
OAO 2
HEOS 1
Titan IIIB-Agena D
Pioneer 9, TETR 2
Titan IIIB-Agena D
TAT-Agena D
Thor-Burner II
Apollo 7
LTTAT-Agena D
Aurorae (ESRO 1A)
OV 2 5 et. al.
TAT-Agena D
Titan IIIB-Agena D
ESSA 7
ATS 4
Explorer 39 & 40
LTTAT-Burner II
Titan IIIB-Agena D
Atlas-Agena
OV1 15 & 16
Explorer 38
LTTAT-Agena D
IDSCS 19-26
Titan IIIB-Agena D
Thor-Burner II
Iris (ESRO 2B)
LTTAT-Agena D
Titan IIIB-Agena D
OV1 13 & 14
Apollo 6
LTTAT-Agena D
Titan IIIB-Agena D
Explorer 37
OGO 5
Scout
LTTAT-Agena D
Apollo 5
Titan IIIB-Agena D
TAT-Agena D
Explorer 36
Surveyor 7

Intelsat IIIA
OCS 8 et. al.
Nimbus B, Secor 10

*Successes: 45
Failures: 3
Total: 48

1968

Thorad-Agena D
Skynet 1
Apollo 12
Azur 1 (GRS A)
Titan IIIB-Agena D
Boreas (ESRO 1B)
LTTAT-Agena D
LTTAT-Agena D
Titan IIIB-Agena D
ATS 5
OSO 6, PAC 1
LTTAT-Agena D
Intelsat IIIE
LTTAT-Agena D
Thor-Burner II
Apollo 11
Biosatellite 3
Explorer 41
OGO 6
Titan IIIB-Agena D
Vela 9, 10. et. al.
Intelsat IIID
Apollo 10
LTTAT-Agena D
Titan IIIB-Agena D
Nimbus 3, Secor 13
Atlas-Agena D
Mariner 7
LTTAT-Agena D
OV1 17, 18, 19 & 17A
Titan IIIB-Agena D
Apollo 9
ESSA 9
Mariner 6
Tacsat 1
Intelsat IIIC
LTTAT-Agena D
ISIS 1
Titan IIIB-Agena D
OSO 5

Pioneer E, TETR C

*Successes: 40
Failures: 1
Total: 41

1969

Explorer 42
NOAA-1
Thorad-Agena D
OFO 1, RM
Titan IIIC
Titan IIIB-Agena D
Thor-Burner II
Thor-Agena D
Scout
Thorad-Agena D
Skynet II
Titan IIIB-Agena D
Intelsat III F-8
Titan IIIB-Agena D
Titan IIIB-Agena D
Atlas-Agena D
Thor-Agena D
Intelsat III F-7
Titan IIIB-Agena D
Apollo 13
Vela 11, 12
Nimbus 4, TOPO 1
NATO 1
Thorad-Agena D
Thor-Burner II
SERT 2
ITOS 1, Oscar 5
Intelsat III F-6
Titan IIIB-Agena D

OAO B

*Successes: 29
Failures: 1
Total: 30

1970

Intelsat IV F-3
Thorad-Agena D
Ariel 4
Explorer 45
DSCS 1, 2
Titan IIIB-Agena D
NOAA 2
Space Test Program
Thor-Burner II
OSO 7, TETR 4
LTTAT-Agena D
EOLE 1
Titan IIIB-Agena D
OV1-20 et. al.
Apollo 15, P&F
Thorad-Agena D
Explorer 44
Titan IIID
LTTAT-Agena D
Mariner 9
Titan IIIC
San Marco 3
Titan IIIB-Agena D
ISIS 2
LTTAT-Agena D
Titan IIIB-Agena D
Explorer 43
Thor-Burner II
NATO 2
Apollo 14
Intelsat IV F-2
Titan IIIB-Agena D

Atlas-Agena D
Mariner H
Thorad-Agena D

*Successes: 32
Failures: 3
Total: 35

1971

Titan 3B-Agena
Atlas-Agena
Aeros
Nimbus 5
Apollo 17
ESRO IV
Explorer 48
ANIK 1
Thor-Burner II
NOAA 2, OSCAR 6
Titan IIID
Atlas F-Burner II
Explorer 47
Triad OI-1
Titan IIIB-Agena
OAO 3
Explorer 46
ERTS 1
Titan IIID
Intelsat IV F-5
Thorad-Agena
Thorad-Agena
Apollo 16, P&F
Thor-Burner II
Titan IIIB/Agena
TD 1A
Pioneer 10
Titan IIIC
HEOS A2
Intelsat F IV
Titan IIID

Titan IIIB-Agena
Titan IIIB-Agena

*Successes: 31
Failures: 2
Total: 33

1972

Explorer 51
DSCS II-B3, B4
Skylab 4
Titan IIID
NOAA 3
Mariner 10
Transit
Explorer 50
Titan IIIB-Agena D
Intelsat IV F-7
Titan IIIB-Agena D
Thor-Burner II
Skylab 3
Titan IIID
Titan IIIC
Explorer 49
Skylab 2
Titan IIIB-Agena D
Skylab 1
Anik 2
Pioneer 11
Titan IIID
Atlas-Agena D

ITOS-E
Titan IIIB-Agena D

*Successes: 23
Failures: 2
Total: 25

1973

Symphonie
Helios
Skynet 2B
Intelsat IV F-8
NOAA
Titan IIID
Ariel 5
Westar B
ANS
Titan IIIB-Agena
Thor-Burner IIA
Aeros 2
Timation 3
Titan IIIB-Agena
Hawkeye
ATS 6
SMS 1
Westar A
Titan IIID
Thor-Burner IIA
UK X4 (Miranda)
San Marco 4 (C2)
Titan IIIB-Agena
Skynet 2A

Viking Proof Test

*Successes: 24
Failures: 1
Total: 25

1974

Titan IIIC
RCA Satcom 1
Titan IIID
Explorer 55
GOES 1
TIP 2
Titan IIIB
Explorer 54
Intelsat IVA F-1
Viking 2
Symphonie B
Viking 1
COS B
Apollo 18
OSO 8
Atlas-Agena
Nimbus 6
SSU 1
DMSP
Intelsat IV F-1
DSCS II-B5, B6
ANIK 3
Explorer 53
Titan IIIB
GEOS 3
Titan IIIB
SMS 2
Landsat 2

Explorer
Atlas F
Intelsat IV F-6

*Successes: 28
Failures: 3
Total: 31

1975

Titan IIID
Marisat 3
Titan IIID-Agena
AMS 1
TIP 3
Satellite Data Sys. 2
NOAA 5
Comstar 2
Palapa 1
Titan IIID
Titan IIIC
Marisat 2
Titan IIIB
P76-5
Comstar 1
Lageos 2
Atlas
Nato IIIA
RCA Satcom 2
Titan IIIB-Agena D
Titan IIIC
Marisat 1
Thor-Burner 2
Intelsat IVA F-2
CTS
Helios 2

*Successes: 26
Failures: 0
Total: 26

1976

Sakura
Atlas-Agena D
NOSS-2
Meteosat 1
Transat
ISEE 1 & 2
Titan IIIB
Voyager 1
Sirio
Voyager 2
HEAO-1
Himawari (GMS-1)
Titan IIID
NTS-2
GOES-2
DMSP
Intelsat IVA F-4
Atlas-Agena
DSCS II-C7, C8
GEOS
Titan IIIB
Palapa 2
Titan IIIC
Nato IIIB

Intelsat IVA
OTS

*Successes: 24
Failures: 2
Total: 26

1977

Anik 4
DSCS II-C11, C12
GPS-4
NATO IIIC
HEAO 2
Nimbus 7/Cameo
Tiros N
GPS 3
ISEE 3
Pioneer Venus/
Multiprobe
Titan IIIB-Agena D
GEOS 2
Comstar 3
Seasat 1
GOES 3
Titan IIID
Titan IIIC
Pioneer Venus/Orbiter
NDS 2
OTS-2
DMSP
HCMM
YURI
BMEWS II
Intelsat IVA F-6
Titan IIID
Landsat 3/Oscar 8
Titan IIIB-Agena 4
NSD-1
FltSatCom 1
IUE
Intelsat IVA F-3

DSCS II-C9, C10

*Successes: 32
Failures: 1
Total: 33

1978

Satcom 3
DSCS II-D13, D14
Magsat
Titan IIIC
HEAO 3
Westar 3
NOAA 6
Titan IIIC
DMSP
UK 6
Titan IIIB
FltSatCom 2
Titan IIID
P78-1
SAGE
SCATHA

*Successes: 16
Failures: 0
Total: 16

1979

Titan IIIB-Agena
Intelsat V F-2
SBS-1
FltSatCom 4
GOES 4
Titan IIID
NOAA B(7)
GPS-6
Atlas F
Solar Max
GPS-5
Titan IIID
FltSatCom 3

Thor
Atlas F

*Successes: 13
Failures: 2
Total: 15

1980

Intelsat V F-3
RCA Satcom IIIR
Columbia (STS-2)
Titan IIIC
SME and UOSAT
SBS 2
Titan IIID
FltSatCom 5
Dynamic Explorer
1 & 2
NOAA 7
Intelsat V F-1
GOES 5
Nova 1
Titan IIIB-Agena D
Columbia (STS-1)
Titan IIIC
Titan IIIB-Agena D
Comstar D-4

NAVSTAR GPS

*Successes: 18
Failures: 1
Total: 19

1981

Atlas E
Titan IIID
STS-5
DSCS II-F16,
DSCS III-A1
RCA Satcom V
Intelsat V F-5
Anik D-1
Landsat 4
STS 4
Westar V
Titan IIID
Insat 1A
STS-3
Titan IIIC
Intelsat V F-4
Westar IV
Titan III
RCA Satcom IV

*Successes: 18
Failures: 0
Total: 18

1982

STS-9
Atlas E
Galaxy 2
RCA Satcom VII
STS-8
Titan IIIB-Agena D
Telstar 301 (J-1)
Atlas E
Galaxy 1
Scout
Titan 34D
STS-7
Atlas H
Exosat
Intelsat V F-6
GOES 6
Titan IIIB
RCA Satcom VI
STS-6
NOAA 8
Atlas H
IRAS

*Successes: 22
Failures: 0
Total: 22

1983

Titan 34D
NOAA-9
Titan 34D
Nato 3D
STS 51-A
Nova 3
STS 41-G
Galaxy 3
Navstar 10
STS 41-D
Titan IIIB
Ampte 1, 2, 3
Titan 34D
Navstar 9
Intelsat VA F-9
Titan IIIB
Titan 34D
STS 41-C
Landsat 5
Atlas H
STS 41-B
Titan 34D

*Successes: 22
Failures: 0
Total: 22

1984

Scout
STS 61-B
STS 61-A
Navstar 11
STS 51-J
Intelsat VA F-12
STS 51-I
Scout
STS 51-F
Intelsat VA F-11
STS 51-G
STS 51-B
STS 51-D
Intelsat VA F-10
Geosat
Titan IIIB
STS 51-C

Titan 34 D

*Successes: 17
Failures: 1
Total: 18

1985

FltSatCom 7
Polar BEAR
NOAA 10
Delta
Atlas H
STS 61-C

GOES 7
Titan 34D
STS 51-L

*Successes: 6
Failures: 3
Total: 9

1986

Titan 34D
Titan 34D
Oscar 31, 32
DMSP
Atlas H
Palapa B2P
GOES 7
Titan IIIB

FltSatCom 6

*Successes: 8
Failures: 1
Total: 9

1987

STS-27
Titan 34D
STS-26
NOAA 11
Titan II
Titan 34D
Scout
Nova 2
Scout
SM-D
Delta
DMSP

*Successes: 12
Failures: 0
Total: 12

1988

GPS 2-5
STS-33
COBE
GPS 2-4
STS-34
FltSatCom 8
Titan 2
Titan 34D
Marcopolo 1
GPS 2-3
STS-28
Titan 4
GPS 2-2
Titan 34D
STS-30
Delta
STS-29
GPS 2-1

*Successes: 18
Failures: 0
Total: 18

1989

STS-35
DMSP
GPS 2-10
STS-38
Titan 4
Inmarsat 2-1
STS-41
GPS 2-9
Marcopolo 2
GPS 2-8
CRRES
Intelsat 6 F4
Insat 1D
Titan 4
Rosat
Scout
STS-31
Palapa B-2R
Atlas E
Pegasus
GPS 2-7
Intelsat 6 F3
STS-36
LACE/RME
GPS 2-6
STS-32
Skynet 4A/JCSat

*Successes: 27
Failures: 0
Total: 27

1990

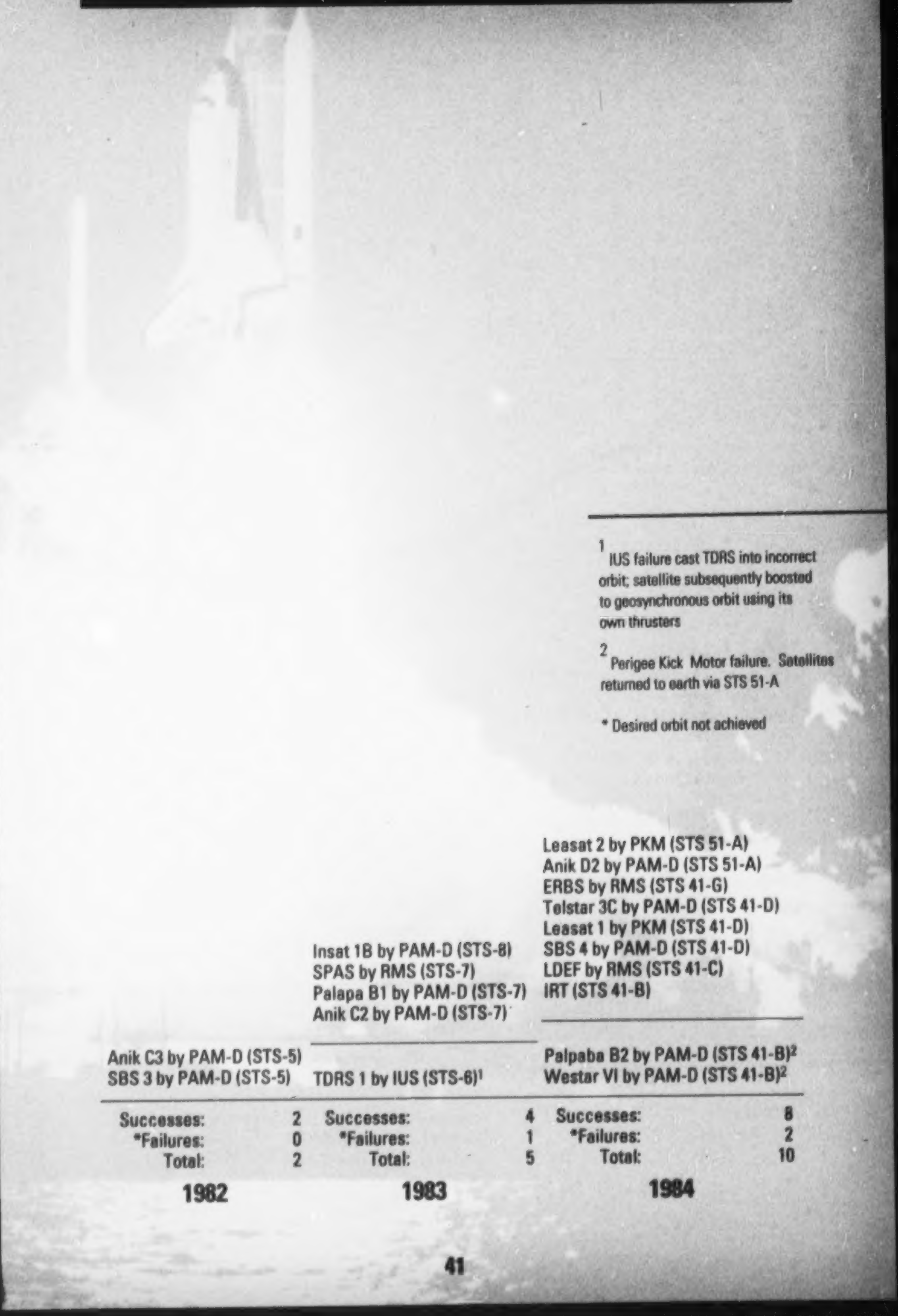
Eutelsat II F3
DMSP
STS-44
Titan 4
STS-48
STS-43
Pegasus
GPS 11
REX
STS-40
Aurora II
NOAA-12
STS-39
Spacenet 4
STS-37
Inmarsat 2 F2
Titan 4
Nato IVA

BS-3H

*Successes: 18
Failures: 1
Total: 19

1991

STS Payload Deployment Record



1982	1983	1984
	Insat 1B by PAM-D (STS-8) SPAS by RMS (STS-7) Palapa B1 by PAM-D (STS-7) Anik C2 by PAM-D (STS-7)	Leasat 2 by PKM (STS 51-A) Anik D2 by PAM-D (STS 51-A) ERBS by RMS (STS 41-G) Telstar 3C by PAM-D (STS 41-D) Leasat 1 by PKM (STS 41-D) SBS 4 by PAM-D (STS 41-D) LDEF by RMS (STS 41-C) IRT (STS 41-B)
Anik C3 by PAM-D (STS-5) SBS 3 by PAM-D (STS-5)	TDRS 1 by IUS (STS-6)[1]	Palpaba B2 by PAM-D (STS 41-B)[2] Westar VI by PAM-D (STS 41-B)[2]
Successes: 2 *Failures: 0 Total: 2	Successes: 4 *Failures: 1 Total: 5	Successes: 8 *Failures: 2 Total: 10

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[1] IUS failure cast TDRS into incorrect orbit; satellite subsequently boosted to geosynchronous orbit using its own thrusters

[2] Perigee Kick Motor failure. Satellites returned to earth via STS 51-A

* Desired orbit not achieved

OEX by EVA (STS 61-B)
Satcom K-2 by PAM-D (STS 61-B)
Aussat 2 by PAM-D (STS 61-B)
Morelos 2 by PAM-D (STS 61-B)
Glomr (STS 61-A)
Unannounced by IUS (STS 51-J)
Unannounced by IUS (STS 51-J)
Leasat 4 by PKM (STS 51-I)
ASC 1 by PAM-D (STS 51-I)
Aussat 1 by PAM-D (STS 51-I)
PDP by RMS (STS 51-F)
Spartan 1 by RMS (STS 51-G)
Telstar 3D by PAM-D (STS 51-G)
Arabsat 1B by PAM-D (STS 51-G)
Morelos 1 by PAM-D (STS 51-G)
Nusat (STS 51-B)
Anik C1 by PAM-D (STS 51-D)
Unannounced by IUS (STS 51-C)

Leasat 3 by PKM[3] (STS 51-D)

Successes:	18
*Failures:	1
Total:	19

1985

Satcom K-1 by PAM D-2
(STS 61-C)

Successes:	1
*Failures:	0
Total:	1

1986

Unannounced (STS-27)
TDRS 3 by IUS (STS-26)

Successes:	2
*Failures:	0
Total:	2

1988

[3] Faulty switch prevented Perigee Kick Motor firing; satellite repaired on orbit (STS 51-I), successfully boosted into geosynch

		DSP by IUS (STS-44)
		UARS by RMS (STS-48)
		TDRS 5 by IUS (STS-43)
Unannounced (STS-33)		CRO-A (STS-39)
Galileo by IUS (STS-34)	Unannounced (STS-38)	CRO-B (STS-39)
Unannounced	Ulysses (STS-41)	CRO-C (STS-39)
Unannounced (STS-28)	HST (STS-31)	Unannounced (STS-39)
Magellan by IUS (STS-30)	Unannounced (STS-36)	IBSS by RMS (STS-39)
TDRS 4 by IUS (STS-29)	Leasat 5 (STS-32)	GRO by RMS (STS-37)
Successes: 6	Successes: 5	Successes: 9
*Failures: 0	*Failures: 0	*Failures: 0
Total: 6	Total: 5	Total: 9
1989	**1990**	**1991**

Payloads in Orbit

Argentina	1	Italy	2
Australia	4	Japan	44
Brazil	3	Luxembourg	2
Canada	16	Mexico	2
Czechoslovakia	1	NATO	7
ESA	24	PRC	10
France	20	Saudi Arabia	2
France/FRG	2	Spain	1
FRG	11	Sweden	2
India	8	UK	19
Indonesia	5	US	606
ITSO	41	USSR	1,215
Total			**2,048**

As of December 31, 1991

Worldwide Successful Space Launches

Year	USSR	US	France	Australia	China	Japan	UK	Europe**	India	Israel	Total
1957	2										2
1958	1	7									8
1959	3	11									14
1960	3	16									19
1961	6	29									35
1962	20	52									72
1963	17	38									55
1964	30	57									87
1965	48	63	1								112
1966	44	73	1								118
1967	66	58*	2	1							127
1968	74	45									119
1969	70	40									110
1970	81	29*	2		1	1					114
1971	83	32*	1		1	2	1				120
1972	74	31*				1					106
1973	86	23									109
1974	81	24*				1					106
1975	89	28*	3		3	2					125
1976	99	26			2	1					128
1977	98	24				2					124
1978	88	32			1	3					124
1979	87	16				2		1			106
1980	89	13				2			1		105
1981	98	18			1	3		2	1		123
1982	101	18			1	1					121
1983	98	22†			1	3		2†	1		127
1984	97	22			3	3		4			129
1985	98	17			1	2		3			121
1986	91	6			2	2		2			103
1987	95	8			2	3		2			110
1988	90	12*			4	2		7		1	116
1989	74	18				2		7			101
1990	75	27			5	3		5		1	116
1991	59	18			1	2		8			88
Total	**2,315**	**953**	**10**	**1**	**29**	**43**	**1**	**43**	**3**	**2**	**3,400**

*Italy has launched nine spacecraft from its San Marco platform. U.S. Scout rockets were used for these launches, so NASA includes them in the U.S. launch total.

**Launches through March 1984 were ESA sponsored. Arianespace, a private company jointly held by European companies has had launch responsibility since May of that year.

† ESA launch from WSMC used U.S. Delta 3914 and is included in U.S. total

Manned Space Flight Records

1st manned flight Yuri Gagarin • Vostok 1 • 4/12/61

Longest flight:365 days, 22 hrs, 39 mns • Soyuz TM-4/TM-6 • Vladimir Titov, Musa Manarov • 12/21/87 - 12/21/88

Shortest flight:15 mns, 28 sec • Alan Shepard • Mercury-Redstone 3 • 5/5/61

Longest shuttle flight 10 days, 21 hrs • STS-32 • Daniel Brandenstein, James Wetherbee, Bonnie Dunbar, David Low, Marsha Ivins • 1/9/90 - 1/20/90

Most accumulated hours 541 days, 31 hrs • Musa Manarov (two flights)

First EVA Alexei Leonov • Voskhod 2 • 3/18/65

Longest orbital EVA 7 hrs, 20 mn • James van Hoften, William Fisher • STS-51I • 9/1/85

Shortest orbital EVA 20 mns • Alexei Leonov • Voskhod 2 • 3/18/65

First rendezvous mission Gemini 7 (Frank Borman, James Lovell) and Gemini 6 (Wally Schirra, Thomas Stafford) • 12/15/65

First docking Gemini 8 (Neil Armstrong, David Scott) with Agena target rocket • 3/16/66

First lunar orbit Apollo 8 (Frank Borman, James Lovell, William Anders) • 12/24/68, 10 orbits

First lunar landing Apollo 11 (Eagle lander with Neil Armstrong, Buzz Aldrin aboard) • 20:17, 7/20/69

First lunar EVA Neil Armstrong • 02:56, 7/21/69

Shortest lunar EVA 2 hr, 32 mn • Neil Armstrong, Buzz Aldrin • Apollo 11 • 7/21/69

Longest lunar EVA 7 hr, 37 mn • Eugene Cernan, Harrison Schmidt • Apollo 17 • 12/13/72

First crew exchange Soyuz 5 cosmonauts (Alexei Yeliseyev, Yevgeni Khrunov) to Soyuz 4 (Vladimir Shatalov), 1/16/69

First station to station transfer Mir/Soyuz T-15 (Leonid Kizim, Vladimir Solovyov) to Salyut 7 • 5/6/86

First flight of reusable manned craft STS-1 (Robert Crippen, John Young) • 4/12/81

First retrieval, repair of satellite Solar Maximum Mission satellite by STS-41C (George Nelson, James van Hoften) • 4/12/85

Year	US Flights	US Persons	Cumulative Crew Hours	USSR Flights	USSR Persons	Cumulative Crew Hours
1961	2	2	31mn	2	2	1d 03h 06mn
1962	3	3	19h 35mn	2	2	3d 00h 25mn
1963	1	1	2d 05h 55mn	2	2	15d 22h 21mn
1964				1	3	18d 23h 12mn
1965	5	10	56d 10h 15mn	1	2	21d 03h 16mn
1966	5	10	83d 01h 37mn			
1967				1	1	22d 06h 04mn
1968	2	6	133d 23h 07mn	1	1	26d 04h 55mn
1969	4	12	243d 02h 04mn	5	11	70d 19h 56mn
1970	1	3	260d 22h 49mn	1	2	106d 05h 54mn
1971	2	6	324d 20h 31mn	2	6	183d 12h 18mn
1972	2	6	395d 19h 40mn			
1973	3	9	910d 11h 25mn	2	4	203d 04h 42mn
1974				3	6	250d 12h 54mn
1975	1	3	937d 15h 49mn	4*	8*	447d 11h 56mn
1976				3	6	565d 20h 40mn
1977				3	6	798d 05h 02mn
1978				5	10	1,136d 18h 52mn
1979				2	4	1,490d 18h 06mn
1980				6	13	1,953d 20h 54mn
1981	2	4	946d 16h 57mn	3	6	2,130d 20h 58mn
1982	3	8	997d 04h 23mn	3	8	2,605d 02h 23mn
1983	4	20	1,139d 22h 26mn	2	5	2,909d 22h 43mn
1984	5	28	1,348d 11h 12mn	3	9	3,679d 21h 58mn
1985	9	58	1,727d 04h 05mn	2	5	4,098d 21h 58mn
1986	1	7	1,769d 18h 32mn	1	2	4,348d 22h 00mn
1987				3	8	5,054d 17h 53mn
1988	2	10	1,811d 21h 02mn	3	9	6,033d 01h 15mn
1989	5	25	1,932d 03h 52mn	1	2	6,615d 14h 53mn
1990	6	32	2,141d 16h 42mn	3	7	7,401d 01h 19mn
1991	6	35	2,406d 07h 50mn	2	6	8,178d 11h 43mn

Total US flights: 74 Total USSR flights: 71 Total crew hours: 10,584 d 19h 33mn

* Soyuz 18A aborted when vehicle flew out of control after 21 mn. Two cosmonauts ejected, landed safely.

International Space-farers*

Afghanistan	1	Mexico	1
Austria	1	Mongolia	1
Bulgaria	2	Netherlands	1
Canada	1	Poland	1
Cuba	1	Romania	1
Czechoslovakia	1	Saudi Arabia	1
France	2	Syria	1
Germany	4	United Kingdom	1
Hungary	1	United States	168
India	1	USSR	72
Japan	1	Vietnam	1
			265

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*by country, through December 31, 1991

Summary Log of Space Launches

The Summary Log lists all known 1991 orbital launches through December 31. Data was compiled from the Goddard Space Flight Center *Satellite Situation Report;* The Royal Aerospace Establishment *Table of Artificial Satellites;* United Nations registration documents; The British Interplanetary Society's *Spaceflight;* and public announcements from agencies responsible for project direction. While every effort is made to verify the accuracy of the data, some information varies from source to source and discrepancies may occur.

Launch Date: Universal time
Launch Site: ESMC = Eastern Space and Missile Center, Cape Canaveral, FL
KSC = Kennedy Space Center, FL
WSMC = Western Space and Missile Center, Vandenberg AFB, CA
STS = Space Transportation System
Weight: Launch weight in kilograms unless otherwise indicated; Soviet, Chinese weights are approximate
Orbital Data: Initial data for satellites launched and reentered; current for satellites still in orbit (December 31, 1991)
Period: Minutes
Perigee and Apogee: Kilometers
Inclination: Degrees to the equator

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Sputnik 1	1957 A2	USSR	Oct 4	Tyuratam	SL-1	83.6	96.2	215	939	65.1	Decayed 1/4/58: 1st artificial satellite, transmitted 21 days
Sputnik 2	1957 B1	USSR	Nov 3	Tyuratam	SL-1	508.3	103.7	212	1,660	65.3	Decayed 4/14/58: carried dog Laika; transmitted 7 days
Vanguard TV 3	None	USN	Dec 6	ETR	Vanguard	1.35	—	—	—	—	Failed to orbit: lost thrust after 2 seconds
Explorer 1	1958 A1	USA	Feb 1	ETR	Jupiter C	4.8	114.7	356	2,548	33.3	Decayed 3/31/70: transmitted until 5/23/58, discovered Van Allen radiation belt
Sputnik 3-1	None	USSR	Feb 3	Tyuratam	SL-1	1,250					Failed to orbit
Vanguard TV 3 (Backup)	None	USN	Feb 5	ETR	Vanguard	1.35	—	—	—	—	Failed to orbit: control system malfunction
Explorer 2	None	USA	Mar 5	ETR	Jupiter C	5	—	—	—	—	Failed to orbit: unsuccessful 4th stage ignition
Vanguard 1	1958 B2	USN	Mar 17	ETR	Vanguard	1.47	133.6	653	3,897	34.2	In orbit: transmitted ``pear-shaped earth'' data until 5/64
Explorer 3	1958 Γ1	USA	Mar 26	ETR	Jupiter C	5	114.7	186	2,799	33.5	Decayed 6/28/58: radiation, micrometeoroid data until 6/16/58
Vanguard TV 5	None	USN	Apr 28	ETR	Vanguard	1.35	—	—	—	—	Failed to orbit: 3rd stage ignition malfunction
Sputnik 3	1958 Δ2	USSR	May 15	Tyuratam	SL-1	1,327	105.8	217	1,864	65.2	Decayed 4/6/60: variety of scientific data returned up to decay
Vanguard SLV 1	None	USN	May 27	ETR	Vanguard	9.8	—	—	—	—	Failed to orbit: improper 3rd stage trajectory
Luna	None	USSR	Jun 25	Tyuratam	SL-3						Lunar probe; failed to orbit
Vanguard SLV 2	None	USN	Jun 26	ETR	Vanguard	9.8	—	—	—	—	Failed to orbit: premature 2nd stage cutoff
Explorer 4	1958 E1	ARPA	Jul 26	ETR	Jupiter C	8	110.1	263	2,213	50.1	Decayed 10/23/59: mapped project Argus radiation until 10-6-58
Thor-Able 1 (Pioneer)	None	USAF	Aug 17	ETR	Thor-Able	37.8	—	—	—	—	Lunar probe failed: initial lunar attempt, 1st stage malfunction
Explorer 5	None	ARPA	Aug 24	ETR	Jupiter C	17.1	—	—	—	—	Failed to orbit: upper stages fired in wrong direction
Luna	None	USSR	Sep 23	Tyuratam	SL-3						Lunar probe; failed to orbit
Vanguard SLV 3	None	USN	Sep 26	ETR	Vanguard	9.8	—	—	—	—	Failed to orbit: insufficient 2nd stage thrust

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Pioneer 1	1958 H1	NASA	Oct 11	ETR	Thor-Able	37.8	—	—	113,854	—	Set distance record, failed to reach moon. Decayed 10/12/58
Luna	None	USSR	Oct 12	Tyuratam	SL-3						Lunar probe; failed to orbit
Beacon 1	None	NASA	Oct 23	ETR	Jupiter C	4	—	—	—	—	Failed to orbit: upper stages separated prior to burnout
Pioneer 2	None	NASA	Nov 8	ETR	Thor-Able	39.1	—	—	—	—	Lunar probe failed: 3rd stage ignition unsuccessful
Luna	None	USSR	Dec 4	Tyuratam	SL-3						Lunar probe; failed to orbit
Pioneer 3	1958 Ⓗ 1	NASA	Dec 6	ETR	Juno II	5.88	—	—	102,333	—	Decayed 12/7/58: failed to reach Moon, provided radiation data
Score	1958 Z1	ARPA	Dec 18	ETR	Atlas B	3,963	101.5	184	1,484	32.3	Decayed 1/21/59: 1st commsat, tx taped messages for 13 days
Luna 1	1959 M1	USSR	Jan 2	Tyuratam	SL-3	361	450 days	0.9766 AU	1.314 AU	0.01	In solar orbit: lunar probe, passed within 5,998 km of Moon
Vanguard 2	1959 A1	NASA	Feb 17	ETR	Vanguard	9.8	124.1	559	3,142	32.9	In orbit: transmitted 18 days, satellite wobble degraded data
Discoverer 1	1959 B1	ARPA	Feb 28	WTR	Thor-Agena A	618	96.0	163	968	90.0	Decayed 3/5/59: 1st polar orbit, no reentry capsule
Pioneer 4	1959 N1	NASA	Mar 3	ETR	Juno II	5.88	398 days	0.9871 AU	1.142 AU	1.30	In solar orbit: lunar probe, passed within 37,300 mi of Moon
Discoverer 2	1959 Γ1	ARPA	Apr 13	WTR	Thor-Agena A	743	90.6	239	346	90.0	Decayed 4/26/59: capsule ejected on orbit 17, lost in Arctic
Vanguard SLV 5	None	NASA	Apr 13	ETR	Vanguard	10.3	—	—	—	—	Failed to orbit: 2nd stage damaged at separation
Discoverer 3	None	ARPA	Jun 3	WTR	Thor-Agena A	753	—	—	—	—	Failed to orbit: Agena fired, no satellite signals received
Luna	None	USSR	Jun 18	Tyuratam	SL-3	—	—	—	—	—	Lunar probe; failed to orbit
Vanguard SLV 6	None	NASA	Jun 22	ETR	Vanguard	10.3	—	—	—	—	Failed to orbit: 2nd stage propulsion malfunction
Discoverer 4	None	ARPA	Jun 25	WTR	Thor-Agena A	743	—	—	—	—	Failed to orbit: insufficient 2nd stage velocity
Explorer S-1	None	NASA	Jul 16	ETR	Juno II	41.4	—	—	—	—	Failed to orbit: destroyed by range safety officer

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Explorer 6	1959 Δ1	NASA	Aug 7	ETR	Thor-Able	64	768	245	42,400	47.0	Decayed before 7/61; 1st earth photo. rad. data to 10/6/59
Discoverer 5	1959 E1	ARPA	Aug 13	WTR	Thor-Agena A	781	94.1	217	739	80.0	Decayed 9/28/59: capsule orbited, decayed 2/11/61
Beacon 2	None	NASA	Aug 14	ETR	Juno II	4.5	—	—	—	—	Failed to orbit: 1st stage, upper stage malfunction
Discoverer 6	1959 Z1	ARPA	Aug 19	WTR	Thor-Agena	783	95.2	212	848	84.0	Decayed 10/20/59: capsule ejected orbit 17, recovery failed
Luna 2	1959 Ξ1	USSR	Sep 12	Tyuratam	SL-3	387	Flight time: 34.0 hours				1st probe to impact moon, 9/15/59
Transit 1A	None	ARPA	Sep 17	ETR	Thor-Able	119	—	—	—	—	Failed to orbit: 3rd stage ignition malfunction
Vanguard 3	1959 H1	NASA	Sep 18	ETR	Vanguard	23	128.0	513	3,524	33.4	In orbit: radiation, micrometeoroid data until 12/11/59
Atlas Able 4A	None	NASA	Sep 24		Atlas-Able						Failed
Luna 3	1959Ⓗ1	USSR	Oct 4	Tyuratam	SL-3	278.5	16.2 days	40,300	476,500	76.8	Decayed 4/29/60: photographed Moon's far side for 40 min
Explorer 7	1959 I1	NASA	Oct 13	ETR	Juno II	41.5	99.9	556	1,088	50.3	In orbit. Magnetic field, solar flare data until 8/24/61
Discoverer 7	1959 K1	ARPA	Nov 7	WTR	Thor-Agena A	794	94.6	99	554	1,087	Decayed 11/26/59. Poor stabilization, capsule not ejected
Discoverer 8	1959 A1	USAF	Nov 20	WTR	Thor-Agena A	795	103.7	187	1,679	80.6	Decayed 3/8/60. capsule overshot recovery area on orbit 15
Atlas-Able 4B (Pioneer)	None	NASA	Nov 26	ETR	Atlas-Able	168	—	—	—	—	Lunar probe failed: payload shroud broke away after 45 sec
Discoverer 9	None	USAF	Feb 4	WTR	Thor-Agena A	765	—	—	—	—	Failed to orbit: premature 1st stage cutoff
Discoverer 10	None	USAF	Feb 19	WTR	Thor-Agena A	765	—	—	—	—	Failed to orbit: destroyed by range safety officer
Midas 1	None	USAF	Feb 26	ETR	Atlas-Agena A	2,025	—	—	—	—	Failed to orbit: 2nd stage failed to separate. Missile Defense Alarm System
Pioneer 5	1960 A1	NASA	Mar 11	ETR	Thor-Able	43	312 days	0.8061 AU	0.995 AU	3.35	In solar orbit: solar system data to 22.5M mi until 6/26/60
Explorer S-46	None	NASA	Mar 23	ETR	Juno II	15.7	—	—	—	—	Failed to orbit: apparent upper stage ignition malfunction

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Tiros 1	1960 B2	NASA	Apr 1	ETR	Thor-Able	120	98.8	677	722	48.4	In orbit: TV and Infrared Observation Satellite, sent 22,952 photos up to 6/17/60
Luna 4	None	USSR	Apr 12	Tyuratam	SL-3						Lunar probe; failed to orbit
Transit 1B	1960 Γ2	ARPA	Apr 13	ETR	Thor-Able Star	121	95.8	373	748	51.3	Decayed 10/5/67: initial navsat, transmitted until 7/12/60
Discoverer 11	1960 Δ1	USAF	Apr 15	WTR	Thor-Agena A	790	92.3	170	589	80.1	Decayed 4/26/60: capsule ejected orbit 17, recovery failed
Echo A-10	None	NASA	May 13	ETR	Delta	56.2	—	—	—	—	Failed to orbit: 2nd stage attitude control malfunction
Sputnik 4	1960 E1	USSR	May 15	Tyuratam	SL-3	2,500	91.3	290	765	65.0	Decayed 9/5/62: Vostok prototype, deorbit failed 5/19/60 as cabin went higher orbit, cabin decayed 10-15-65
Midas 2	1960 Z1	USAF	May 24	ETR	Atlas-Agena A	2,300	94.4	484	511	33.0	Decayed 2/7/74: datalink quit 2nd day Missile Defense Alarm System
Transit 2A	1960 H1	USN	Jun 22	ETR	Thor-Able Star	101	101.2	603	1,018	66.7	In orbit: returned navigation, geodetic data until 8/62
Solrad 1	1960 H2	USN	Jun 22	ETR	Thor-Able Star	19	100.9	599	985	66.7	In orbit: 1st sub-satellite, returned solar radiation data until 4/61
Discoverer 12	None	USAF	Jun 29	WTR	Thor-Agena A	790	—	—	—	—	Failed to orbit: 2nd stage attitude instability
None	None	USSR	Jul 23	Tyuratam	SL-3						Vostok precursor; failed to orbit
Discoverer 13	1960 Ⓗ 1	USAF	Aug 10	WTR	Thor-Agena A	850	94.1	258	683	82.0	Decayed 11/14/60: 1st recovery from ocean on orbit 17
Echo 1	1960 I1	NASA	Aug 12	ETR	Delta	75.9	118.2	1,524	1,684	47.2	Decayed 5/24/68: 1st passive commsat, relayed voice, TV signals
Discoverer 14	1960 K1	USAF	Aug 18	WTR	Thor-Agena A	850	94.5	186	805	79.6	Decayed 9/16/60: 1st mid-air capsule recovery on orbit 17
Courier 1A	None	ARPA	Aug 18	ETR	Thor-Able Star	225	—	—	—	—	Failed to orbit: booster exploded 2.5 min after launch
Sputnik 5	1960 Λ1	USSR	Aug 19	Tyuratam	SL-3	1,440	90.7	297	324	65.0	Reentered 8/20/60: dogs Belka, Strelka recovered on orbit 18
Discoverer 15	1960 M1	USAF	Sep 13	WTR	Thor-Agena A	863	94.2	199	761	80.9	Decayed 10/18/60: capsule ejected 17th pass, lost in ocean

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Atlas-Able 5 (Pioneer)	None	NASA	Sep 25	ETR	Atlas-Able	175	—	—	—	—	Lunar probe failed: 2nd stage oxidizer system malfunction. Pieces recovered in South Africa
Courier 1B	1960 N1	USA	Oct 4	ETR	Thor-Able Star	230	107.1	968	1,215	28.3	In orbit: 1st active-repeater commsat, operated for 17 days
None	None	USSR	Oct 10	Tyuratam	SL-6	—	—	—	—	—	Mars probe failed, announced by U.S. in 1962
Samos 1	None	USAF	Oct 11	WTR	Atlas-Agena A	1,845	—	—	—	—	Failed to orbit: 2nd stage ignited but didn't reach orbit. Satellite and Missile Observation Satellite
None	None	USSR	Oct 14	Tyuratam	SL-6	—	—	—	—	—	Mars probe failed: announced by U.S. in 1962
Discoverer 16	None	USAF	Oct 26	WTR	Thor-Agena B	1,091	—	—	—	—	Failed to orbit: 2nd stage, booster failed to separate
Explorer 8	1960 Ξ1	NASA	Nov 3	ETR	Juno II	41	106.3	407	1,699	49.9	In orbit: ionospheric research satellite, tx until 12/28/60
Discoverer 17	1960 O1	USAF	Nov 12	WTR	Thor-Agena B	1,091	96.4	190	984	81.9	Decayed 12/29/60: mid-air capsule recovery on orbit 31
Tiros 2	1960 Π1	NASA	Nov 23	ETR	Delta	130	97.4	585	667	48.5	In orbit: returned 36,156 cloud cover photos until 12/4/61
Transit 3A/ Solrad 2	None	USN	Nov 30	ETR	Thor-Able Star	91/18	—	—	—	—	Failed to orbit: destroyed by range safety officer. Pieces recovered in Cuba
Sputnik 6	1960 P1	USSR	Dec 1	Tyuratam	SL-3	4,563	88.6	166	232	65.0	Decayed 12/2/60: recovery attempt failed, canine cabin lost
Explorer S-56	None	NASA	Dec 4	WI	Scout	6.3	—	—	—	—	Failed to orbit: 2nd stage ignition malfunction
Discoverer 18	1960 Σ1	USAF	Dec 7	WTR	Thor-Agena B	1,240	93.8	243	661	80.8	Decayed 4/2/61: mid-air capsule recovery on orbit 48
Atlas-Able 5B (Pioneer)	None	NASA	Dec 15	ETR	Atlas-Able	175	—	—	—	—	Lunar probe failed: exploded 70 seconds after lift off
Discoverer 19	1960 T1	USAF	Dec 20	WTR	Thor-Agena B	1,060	93.0	209	631	82.8	Decayed 1/23/61: infrared experiments, no reentry capsule
None	None	USSR	Dec 21	Tyuratam	SL-3						Vostok precursor; failed to orbit. Cabin w/dogs recovered
Samos 2	1961 A1	USAF	Jan 31	WTR	Atlas-Agena A	1,900	95.0	474	557	97.0	Decayed 10/21/73: returned micrometeoroid impact data
Sputnik 7	1961 B1	USSR	Feb 4	Tyuratam	SL-6	6,483	89.8	212	318	65.0	Decayed 2/26/61: believed to be Venus probe abort

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Venera	None	USSR	Feb 4	Tyuratam	SL-6						Fourth stage failure
Venera 1	1961 Γ1	USSR	Feb 12	Tyuratam	SL-6	643.5	300 days	0.7183 AU	1.0190 AU	0.58	In solar orbit: Venus probe, radio contact lost at 4.7M mi
Sputnik 8	1961 Γ3	USSR	Feb 12	Tyuratam	SL-6	6,424	89.7	123	198	65.0	Decayed 2/25/61: launched Venera 1 from parking orbit
Explorer 9	1961 Δ1	NASA	Feb 16	WI	Scout	6.6	118.3	634	2,583	38.6	Decayed 4/9/64: 12-ft balloon to study atmospheric density
Discoverer 20	1961 E1	USAF	Feb 17	WTR	Thor-Agena B	1,110	95.4	228	786	80.4	Decayed 7/28/62: programmer failure, no capsule ejection
Discoverer 21	1961 Z1	USAF	Feb 18	WTR	Thor-Agena B	1,110	93.8	240	1,069	80.7	Decayed 4/20/62: infrared experiments, no reentry capsule
Transit 3B/ Lofti 1	1961 H1	USN	Feb 22	ETR	Thor-Able Star	112/25	94.5	167	1,002	28.4	Decayed 3/30/61: 2nd stage, satellites failed to separate
Explorer S-45	None	NASA	Feb 24	ETR	Juno II	34	—	—	—	—	Failed to orbit: 3rd and 4th stage ignition malfunction
Sputnik 9	1961 Ⓗ 1	USSR	Mar 9	Tyuratam	SL-3	4,700	88.5	173	239	64.9	Reentered 3/9/61: cabin with dog Chernushka recovered
Sputnik 10	1961 I1	USSR	Mar 25	Tyuratam	SL-3	4,695	88.4	164	230	64.9	Reentered 3/25/61: dog Zvezdochka recovered after 1 orbit
Explorer 10	1961 K1	NASA	Mar 25	ETR	Delta	35	112 hrs	221	181,100	33.9	Decayed 6/68: magnetic field data for planned 60 hr
Discoverer 22	None	USAF	Mar 30	WTR	Thor-Agena B	1,150	—	—	—	—	Failed to orbit, 2nd stage control system malfunction
Discoverer 23	1961 Λ1	USAF	Apr 8	WTR	Thor-Agena B	1,150	101.2	295	651	81.9	Decayed 4/16/62: capsule orbited, decayed 5/23/62
Vostok	1961 M1	USSR	Apr 12	Tyuratam	SL-3	4,725	89.1	169	315	65.0	Reentered 4/12/61: 1st manned space flight, cabin with Yuri Gagarin recovered in USSR after 1 orbit, 1.8 hr
Mercury-Atlas 3	None	NASA	Apr 25	ETR	Atlas D	900	—	—	—	—	Failed to orbit: destroyed by range safety officer
Explorer 11	1961 N1	NASA	Apr 27	ETR	Juno II	37	106.2	487	1,779	28.8	In orbit: gamma ray counter returned data until 12/6/61
Mercury-Redstone 3	None	NASA	May 5	ETR	Redstone	1,280	Sub-orbital flight of 15 min, 22 sec				Recovered 5/5/61: 1st American in space, Alan Shepard reached an altitude of 116.5 mi, Freedom 7 capsule recovered 488.8 km downrange

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Explorer S-45A	None	NASA	May 24	ETR	Juno II	33	—	—	—	—	Failed to orbit: 2nd stage ignition malfunction
Discoverer 24	None	USAF	Jun 8	WTR	Thor-Agena B	1,150	—	—	—	—	Failed to orbit: 2nd stage ignition malfunction
Discoverer 25	1961 Ξ1	USAF	Jun 16	WTR	Thor-Agena B	1,150	90.9	222	409	82.1	Decayed 7/12/61: capsule recovered from ocean on orbit 33
Transit 4A	1961 O1	USN	Jun 29	ETR	Thor-Able Star	79	103.7	870	990	66.8	In orbit: 1st nuclear power supply, SNAP-3. Stage exploded, 215 pieces in orbit
Injun 1/Solrad 3	1961 O2	USN	Jun 29	ETR	Thor-Able Star	25/16	103.7	872	994	66.8	In orbit: failed to separate, Injun sent radiation data until 3/6/63, Solrad returned solar X-ray data until late 1961
Explorer S-55	None	NASA	Jun 30	WI	Scout	84	—	—	—	—	Failed to orbit: 3rd stage ignition malfunction
Discoverer 26	1961 Π1	USAF	Jul 7	WTR	Thor-Agena B	1,150	95.0	228	808	82.9	Decayed 12/5/61: capsule recovered in mid-air on orbit 32
Tiros 3	1961 P1	NASA	Jul 12	ETR	Delta	129	100.2	730	801	47.9	In orbit: returned 35,033 photos up to 2/27/62
Midas 3	1961 Σ1	USAF	Jul 12	WTR	Atlas-Agena B	1,600	161.4	3,345	3,538	91.1	In orbit: 1st Midas launch from West Coast
Mercury-Redstone 4	None	NASA	Jul 21	ETR	Redstone	1,276	Sub-orbital flight of 15 min, 37 sec				Recovered 7/21/61: 2nd U.S. manned flight, Virgil Grissom reached an altitude of 190.3 km. Liberty Bell 7 capsule not recovered
Discoverer 27	None	USAF	Jul 21	WTR	Thor-Agena B	1,150	—	—	—	—	Failed to orbit: destroyed by range safety officer
Discoverer 28	None	USAF	Aug 3	WTR	Thor-Agena B	1,150	—	—	—	—	Failed to orbit: 2nd stage control system malfunction
Vostok 2	1961 T1	USSR	Aug 6	Tyuratam	SL-3	4,730	88.6	166	232	64.9	Reentered 8/7/61: Gherman Titov landed after 17 orbits, 25.3 hr
Explorer 12	1961 γ1	NASA	Aug 16	ETR	Delta	38	1,585	790	76,620	33.3	Decayed 9/63: radiation and solar wind data until 12/6/61
Ranger 1	1961 Φ1	NASA	Aug 23	ETR	Atlas-Agena B	306	91.1	179	446	32.9	Decayed 8/30/61: attempt to reach deep space orbit failed
Explorer 13	1961 X1	NASA	Aug 25	WI	Scout	86	97.3	125	1,164	36.4	Decayed 8/28/61: micrometeoroid satellite, orbit too low
Discoverer 29	1961 W1	USAF	Aug 30	WTR	Thor-Agena B	1,150	91.0	152	542	82.1	Decayed 9/10/61: capsule recovered from ocean on orbit 33
Samos 3	None	USAF	Sep 9	WTR	Atlas-Agena B	1,890	—	—	—	—	Exploded on launch pad

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Discoverer 30	1961 Ω1	USAF	Sep 12	WTR	Thor-Agena B	1,150	92.4	235	546	82.6	Decayed 12/11/61: capsule recovered in mid-air on orbit 33
Mercury Atlas 4	1961 AA1	NASA	Sep 13	ETR	Atlas D	1,200	88.6	156	248	32.6	Reentered 9/13/61: recovered from Atlantic after 1 orbit
Discoverer 31	1961 AB1	USAF	Sep 17	WTR	Thor-Agena B	1,150	91.0	235	396	82.7	Decayed 10/26/61: capsule separation failed
Discoverer 32	1961 AΓ1	USAF	Oct 13	WTR	Thor-Agena B	1,150	90.8	234	395	81.7	Decayed 11/13/61: mid-air capsule recovery on orbit 18
Midas 4	1961 AΔ1	USAF	Oct 21	WTR	Atlas-Agena B	1,800	165.9	3,485	3,760	91.2	In orbit: West Ford ejected but dipoles failed to disperse
Kosmos	None	USSR	Oct 21	Kapustin Yar	SL-7						1st Kosmos; failed to orbit
Discoverer 33	None	USAF	Oct 23	WTR	Thor-Agena B	1,150	—	—	—	—	Failed to orbit: launch vehicle shut down prematurely
Mercury-Scout 1	None	NASA	Nov 1	ETR	Scout	67.5	—	—	—	—	Failed to orbit: destroyed by range safety officer
Discoverer 34	1961 AE1	USAF	Nov 5	WTR	Thor-Agena B	1,150	97.2	227	1,011	82.7	Decayed 12/7/62: malfunction prevented capsule ejection
Discoverer 35	1961 AZ1	USAF	Nov 15	WTR	Thor-Agena B	2,100	89.8	238	278	81.6	Decayed 12/3/61: capsule recovered in mid-air on orbit 18
Transit 4B	1961 AH1	USN	Nov 15	ETR	Thor-Able Star	86	105.8	956	1,106	32.4	In orbit: tx'd until 7/62, SNAP 3 operated 8 mos.
Traac	1961 AH2	USN	Nov 15	ETR	Thor-Able Star	109	105.8	957	1,109	32.4	Transit Research and Attitude Control. In orbit.
Ranger 2	1961 AⒽ1	NASA	Nov 18	ETR	Atlas-Agena B	304	88.3	150	242	33.3	Decayed 11/20/61: attempt to reach deep space orbit failed
Samos 4	None	USAF	Nov 22	WTR	Atlas-Agena B	1,860	—	—	—	—	Failed to orbit
Mercury-Atlas 5	1961 AI1	NASA	Nov 29	ETR	Atlas D	1,300	88.5	158	237	32.5	Reentered 11/29/61: chimp Enos recovered after 2 orbits
None	None	USSR	Dec 11	Tyuratam	SL-3						Failed to orbit
Discoverer 36	1961 AK1	USAF	Dec 12	WTR	Thor-Agena B	1,150	91.5	241	484	81.2	Decayed 3/8/62: capsule recovered in Pacific
Oscar 1	1961 AK2	USAF	Dec 12	WTR	Thor-Agena B	5	91.1	245	474	81.2	Orbiting Satellite Carrying Amateur Radio. 1st ham sat, tx'd 18 days. Decayed 1-31-62

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	None	USSR	Dec 21	Kapustin Yar	SL-7						Failed to orbit
Samos 5	1961 AΛ1	USAF	Dec 22	WTR	Atlas-Agena B	1,860	94.5	244	702	89.6	Decayed 8/14/62
Discoverer 37	None	USAF	Jan 13	WTR	Thor-Agena B	1,150	—	—	—	—	Failed to orbit: malfunction following 2nd stage ignition
Composite 1	None	USN	Jan 24	ETR	Thor-Able Star	98.5	—	—	—	—	Failed to orbit: low 2nd stage thrust, carried 5 satellites
Ranger 3	1962 A1	NASA	Jan 26	ETR	Atlas-Agena B	327	406.4 days	0.9839 AU	1.163 AU	0.3988	In solar orbit: lunar probe, missed Moon by 22,862 mi
Tiros 4	1962 B1	NASA	Feb 8	ETR	Delta	129	100.1	712	840	48.3	In orbit: returned 32,593 cloud cover photos up to 6-10-62
Mercury-Atlas 6	1962 Γ1	NASA	Feb 20	ETR	Atlas D	1,352	88.5	159	265	32.5	Re-entered 2/20/62: 1st U.S. manned orbital mission John Glenn and "Friendship 7" recovered after 3 orbits, 4.9 hr
None	1962 Δ1	USAF	Feb 21	WTR	Thor-Agena B	1,000	89.7	167	374	82.0	Decayed 3/4/62
Discoverer 38	1962 E1	USAF	Feb 27	WTR	Thor-Agena B	1,150	89.7	208	308	82.2	Decayed 3/21/62: capsule recovered in mid-air after 65 orbits
OSO 1	1962 Z1	NASA	Mar 7	ETR	Delta	208	93.2	553	595	32.9	Decayed 10/8/81: Orbiting Solar Observatory transmitted data on 75 solar flares until 8/6/63
Samos 6	1962 H1	USAF	Mar 7	WTR	Atlas-Agena B	1,860	93.9	251	676	90.9	Decayed 6/7/63
Kosmos 1	1962 Ⓗ 1	USSR	Mar 16	Kapustin Yar	SL-7	315	96.4	135	204	49.0	Decayed 5/25/62: numerous scientific objectives announced as Kosmos research satellite series initiated
Kosmos 2	1962 I1	USSR	Apr 6	Kapustin Yar	SL-7	285	102.5	215	1,488	49	Decayed 8/19/63: returned radiation belt, cosmic ray data
Midas 5	1962 K1	USAF	Apr 9	WTR	Atlas-Agena B	1,860	152.9	2,782	3,406	86.7	In orbit
None	1962 Λ1	USAF	Apr 18	WTR	Thor-Agena B	1,150	91.5	200	441	73.5	Decayed 5/28/62
Ranger 4	1962 M1	NASA	Apr 23	ETR	Atlas-Agena B	328	Flight time: 64.0 hours				Impacted on Moon: timer failure, experiments inoperative
Kosmos 3	1962 N1	USSR	Apr 24	Kapustin Yar	SL-7	330	93.8	216	707	49.0	Decayed 10/17/62: returned radiation belt, cosmic ray data

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Date			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 4	1962 Ξ1	USSR	Apr 26	Tyuratam	SL-3	4,600	90.6	285	317	65.0	Reentered 4/29/62: 1st announced Kosmos recovery
Ariel 1	1962 O1	NASA/ UK	Apr 26	ETR	Delta	60	100.9	389	1,214	53.9	Decayed 5/24/76: Joint U.S./UK ionospheric satellite, tx'd ionospheric, X-ray, cosmic ray data until 11/64
Solrad 4B	None	USN	Apr 26	WTR	Scout	91	—	—	—	—	Failed to orbit: solar radiation
Samos 7	1962 Π1	USAF	Apr 26	WTR	Atlas-Agena B	1,588	88.6	203	204	92.0	Decayed 4/28/62
None	1962 P1	USAF	Apr 28	WTR	Thor-Agena B	1,150	91.1	180	475	73.2	Decayed 5/26/62
Anna 1A	None	USN	May 10	ETR	Thor-Able Star	160	—	—	—	—	Failed to orbit: 2nd stage ignition malfunction. Army, Navy, NASA, Air Force joint satellite
None	1962 Σ1	USAF	May 15	WTR	Thor-Agena B	1,150	94.0	305	634	82.5	Decayed 11/26/63
None	None	USAF	May 23	WTR	Scout	91	—	—	—	—	Failed to orbit
Mercury-Atlas 7	1962 T1	NASA	May 24	ETR	Atlas D	1349	88.3	154	260	32.5	Reentered 5/24/62: Aurora 7 and Scott Carpenter recovered after 3 orbits, 4.9 hours; landed 402 km from target; splashdown in Atlantic
Kosmos 5	1962 γ1	USSR	May 28	Kapustin Yar	SL-7	280	102.8	190	1,587	49.1	Decayed 5/2/63: monitored artificial radiation
None	1962 Φ1	USAF	May 30	WTR	Thor-Agena B	1,150	89.9	199	319	74.1	Decayed 6/11/62
None	1962 X1	USAF	Jun 2	WTR	Thor-Agena B	1,150	90.5	211	385	74.3	Decayed 6/28/62
Oscar 2	1962 X2	USAF	Jun 2	WTR	Thor-Agena B	10	90.5	207	394	74.3	Decayed 6/21/62: 2nd ham radio, tx'd 18 days
Samos 8	1962 Ψ1	USAF	Jun 17	WTR	Atlas-Agena B	1,860	—	—	—	—	Decayed 6/18/62
None	1962 Ω1	USAF	Jun 18	WTR	Thor-Agena B	1,500	92.3	370	411	82.0	Decayed 10/29/63
Tiros 5	1962 AA1	NASA	Jun 19	ETR	Delta	129	99.9	578	922	58.1	In orbit: returned 58,226 cloud cover photos until 5/4/63
None	1962 AB1	USAF	Jun 23	WTR	Thor-Agena B	1,150	89.0	213	293	75.1	Decayed 7/7/62
None	1962 AΓ1	USAF	Jun 28	WTR	Thor-Agena D	1,150	93.6	211	689	76.0	Decayed 9/14/62
Kosmos 6	1962 AΔ1	USSR	Jun 30	Kapustin Yar	SL-7	355	90.6	264	344	49	Decayed 8/6/62
Telstar 1	1962 AE1	AT&T	Jul 10	ETR	Delta	77	157.8	936	5,653	44.8	In orbit: active-repeater commsat, tx'd until 2/21/63
Samos 9	1962 AZ1	USAF	Jul 18	WTR	Atlas-Agena B	1,860	88.7	184	236	96.1	Decayed 7/25/62
None	1962 AH1	USAF	Jul 21	WTR	Thor-Agena B	1,150	90.0	208	381	70.3	Decayed 8/14/62

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Mariner 1	None	NASA	Jul 22	ETR	Atlas-Agena B	200	—	—	—	—	Venus probe failed: destroyed by range safety officer
None	1962 AⒽ1	USAF	Jul 28	WTR	Thor-Agena B	1,150	90.7	225	386	71.1	Decayed 8/24/62
Kosmos 7	1962 AI1	USSR	Jul 28	Tyuratam	SL-3	4,600	90.1	197	356	65.0	Reentered 8/1/62: returned radiation data
None	1962 AK1	USAF	Aug 2	WTR	Thor-Agena D	1,150	90.2	204	418	82.3	Decayed 8/26/62
Samos 10	1962 AL1	USAF	Aug 5	WTR	Atlas-Agena B	1,860	88.6	205	205	96.3	Decayed 8/6/62
Vostok 3	1962 AM1	USSR	Aug 11	Tyuratam	SL-3	4,722	88.5	166	218	65	Reentered 8/15/62: Andrian Nikolayev landed by parachute after 64 orbits, 94.4 hr; part of 1st Soviet dual-launch flight
Vostok 4	1962 AN1	USSR	Aug 12	Tyuratam	SL-3	4,728	88.5	169	222	65	Reentered 8/15/62: Pavel Popovich landed by parachute after 46 orbits, 71.0 hr; came within 4.9 km of Vostok 3 on orbit 1
Kosmos 8	1962 Ξ1	USSR	Aug 18	Kapustin Yar	SL-7	337	92.9	251	591	49	Decayed 8/17/63
None	1962 AO1	USAF	Aug 23	WTR	Scout	91	98.8	594	794	98.5	In orbit
None	1962 AΠ1	USSR	Aug 25	Tyuratam	SL-6	890	88.7	168	221	64.9	Decayed 8/28/62: probable Venus probe failure
Mariner 2	1962 AP1	NASA	Aug 27	ETR	Atlas-Agena B	201	348 days	0.7046 AU	1.229 AU	1.66	In solar orbit 34,745 km Venus flyby, data to 86.7M km
None	1962 AΣ1	USAF	Aug 29	WTR	Thor-Agena D	1,150	90.4	187	400	65.2	Decayed 9/10/62
None	1962 AT1	USSR	Sep 1	Tyuratam	SL-6	6,500	89.4	180	310	64.9	Decayed 9/6/62: probable Venus probe failure
None	1962 Aγ1	USAF	Sep 1	WTR	Thor-Agena B	1,150	94.4	300	669	82.2	Decayed 10/26/64
None	1962 AΩ1	USSR	Sep 12	Tyuratam	SL-6	6,500	88.4	186	213	64.9	Decayed 9/14/62: probable Venus probe failure
None/ERS 2	1962 AX1	USAF	Sep 17	WTR	Thor-Agena B	1,500	92.8	204	668	81.9	Decayed 11/16/62: Environmental Research Subsatellite failed to eject
Tiros 6	1962 AΨ1	NASA	Sep 18	ETR	Delta	127	98.2	686	713	58.3	In orbit: returned 66,674 cloud cover photos until 10/11/63
Kosmos 9	1962 AΩ1	USSR	Sep 27	Tyuratam	SL-3	4,600	90.9	292	346	65	Reentered 10/1/62: returned radiation data
Alouette 1	1962 BA1	CAN	Sep 29	WTR	Thor-Agena B	145	105.3	991	1,025	80.5	In orbit: 1st Canadian, ionospheric data

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1962 BB1	USAF	Sept 29	WTR	Thor-Agena D	91	90.3	203	376	65.4	Decayed 10/14/62
Explorer 14	1962 BΓ1	NASA	Oct 2	ETR	Delta	40	2,185	281	98,530	33.0*	Tx'd magnetosphere data until 10/8/63. Decayed 7/1/66
Mercury-Atlas 8	1962 BΔ1	NASA	Oct 3	ETR	Atlas D	1,370	89.0	153	285	32.5	Reentered 10/3/62: Sigma 7 with Wally Schirra recovered within 8 km of carrier after 6 orbits, 9.2 hrs. Splashdown in Pacific
None	1962 BE1	USAF	Oct 9	WTR	Thor-Agena B	—	90.9	213	427	81.5	Decayed 11/16/62
Kosmos 10	1962 BZ1	USSR	Oct 17	Tyuratam	SL-3	4,600	90.2	197	367	65.0	Reentered 10/21/62: returned radiation data
Ranger 5	1962 BH1	NASA	Oct 18	ETR	Atlas-Agena B	340	366 days	0.9490 AU	1.052 AU	0.3901	In solar orbit: lunar probe, missed Moon by 450 mi
Kosmos 11	1962 BⒽ1	USSR	Oct 20	Kapustin Yar	SL-7	315	96.1	234	901	49.0	Decayed 5/18/64
None	1962 BI1	USSR	Oct 24	Tyuratam	SL-6	6,500	91.8	180	485	64.8	Decayed 10/29/62: probable Mars probe failure. Exploded 10/29, 24 pieces
Starad	1962 BK1	USAF	Oct 26	WTR	Thor-Agena D	1,100	147.8	194	5,537	71.4	Decayed 10/5/67: Starfish artificial radiation data until 1/18/63
Explorer 15	1962 BΛ1	NASA	Oct 27	ETR	Delta	45	315.2	313	17,640	18.0*	Decayed 12/19/78. Tx'd radiation decay data until 2/9/63
Anna 1B	1962 BM1	USN	Oct 31	ETR	Thor-Able Star	161	107.9	1,076	1,182	50.1	In orbit: provided geodetic data
Mars 1	1962 BNU3	USSR	Nov 1	Tyuratam	SL-6	893.5	519 days	0.9237 AU	1.604 AU	2.683	In solar orbit: Mars probe, lost earth lock at 106M km
None	1962 BΞ1	USSR	Nov 4	Tyuratam	SL-6	890	88.7	—	—	64.7	Decayed 11/5/62: probable Mars probe failure
None	1962 BO1	USAF	Nov 5	WTR	Thor-Agena B	1,150	90.7	185	265	75.0	Decayed 12/3/62
None	1962 BΠ1	USAF	Nov 11	WTR	Atlas-Agena B	1,860	88.7	206	206	96.0	Decayed 11/12/62
None	1962 BP1	USAF	Nov 24	WTR	Thor-Agena B	1,150	89.8	204	310	65.2	Decayed 12/13/62
None	1962 BΣ1	USAF	Dec 4	WTR	Thor-Agena D	1,150	89.2	169	222	65.0	Decayed 12/8/62
None	1962 BT1	USAF/ USN	Dec 13	WTR	Thor-Agena D	23	116.0	231	2,786	70.4	Decayed 2/9/67

*Initial elements. Current elements not maintained

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Injun 3	1962 BT2	USAF/ USN	Dec 13	WTR	Thor-Agena D	52	116.3	235	2,785	70.3	Decayed 8/25/68: tx'd radiation decay data until 11/3/63
None	1962 BT3	USAF/ USN	Dec 13	WTR	Thor-Agena D	3	115.6	226	2,763	70.3	Decayed 7/1/63
None	1962 BT4	USAF/ USN	Dec 13	WTR	Thor-Agena D	37	116.2	231	2,784	70.4	Decayed 1/18/66
None	1962 BT5	USAF/ USN	Dec 13	WTR	Thor-Agena D	23	116.0	229	2.785	70.3	Decayed 2/5/67
Relay 1	1962 Bγ1	NASA	Dec 13	ETR	Delta	78	185.1	1,317	7,442	47.5	In orbit: commsat; experiments conducted until 2/65
None	1962 BΦ1	USAF	Dec 14	WTR	Thor-Agena D	1,150	90.5	199	392	70.0	Decayed 1/8/63
Explorer 16	1962 BX1	NASA	Dec 16	WI	Scout	100	104.2	747	1,166	52.0	In orbit: tx'd micrometeoroid data until 7/22/63
None/ERS 3&4	None	USAF	Dec 17	WTR	Atlas-Agena B	101/1/1	—	—	—	—	Failed to orbit: Environmental Research Subsatellites
Transit 5A	1962 BΨ1	USN	Dec 19	WTR	Scout	61	90	297	725	90.6	Decayed 9/25/86. Operational prototype, power failure 1st day
Kosmos 12	1962 BΩ1	USSR	Dec 22	Tyuratam	SL-3	4,730	90.5	198	392	65	Reentered 12/30/62: returned radiation data
None	1963 1A*	USSR	Jan 4	Tyuratam	SL-6	2,500	87.5	151	151	64.9	Decayed 1/5/63: probable lunar probe failure
None	1963 2A	USAF	Jan 7	WTR	Thor-Agena D	1,150	90.5	205	399	82.0	Decayed 1/24/63
None	1963 3A	USAF	Jan 16	WTR	Thor-Agena D	1,100	94.7	459	533	82.0	Decayed 1/9/69
Luna	None	USSR	Feb 2	Tyuratam	SL-6						Lunar probe; failed to orbit
Syncom 1	1963 4A	NASA	Feb 14	ETR	Delta	39	1,425.5	34,392	36,739	33.3†	In orbit: communication lost at orbital injection
None	1963 5A	USAF	Feb 19	WTR	Scout	40	97.8	505	791	100.5	Decayed 12/26/79
None	None	USAF	Feb 28	WTR	TAT- Agena D	1,500	—	—	—		Failed to orbit: 1st Thrust Augmented Thor use
Luna	None	USSR	Mar 3	Tyuratam	SL-6						Lunar probe; failed to orbit

*New international designation system initiated 1/1/63

†Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Date			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	None	USAF	Mar 18	WTR	TAT-Agena D	1,500	—	—	—	—	Failed to orbit
Kosmos 13	1963 6A	USSR	Mar 21	Tyuratam	SL-3	4,730	89.8	192	324	65.0	Reentered 3/29/63. Returned radiation data
None	1963 7A	USAF	Apr 1	WTR	Thor-Agena D	1,150	90.6	201	408	75.4	Decayed 4/26/63
Luna 4	1963 8A	USSR	Apr 2	Tyuratam	SL-6	1,422		Barycentric orbit			In orbit. Lunar probe, missed Moon by 8,499 km
Explorer 17	1963 9A	NASA	Apr 3	ETR	Delta	185	96.4	255	917	57.6	Decayed 11/24/66: atmospheric research data until 7/10/63
None	None	USAF	Apr 5	WTR	Scout	84	—	—	—	—	Failed to orbit
Kosmos 14	1963 10A	USSR	Apr 13	Kapustin Yar	SL-7	—	92.1	252	499	49.0	Decayed 8/29/63
Kosmos 15	1963 11A	USSR	Apr 22	Tyuratam	SL-3	4,730	89.8	160	358	65.0	Reentered 4/27/63: returned radiation data
None	None	USAF	Apr 26	WTR	Scout	40	—	—	—	—	Failed to orbit
None	None	USAF	Apr 26	WTR	Thor-Agena D	1,150	—	—	—	—	Failed to orbit
Kosmos 16	1963 12A	USSR	Apr 28	Tyuratam	SL-3	4,730	90.4	194	388	65.0	Reentered 5/8/63: returned radiation data
Telstar 2	1963 13A	AT&T	May 7	ETR	Delta	79	225.3	966	10,808	42.7	In orbit: active-repeater commsat, tx'd until 5/65
None	1963 14A	USAF	May 9	WTR	Atlas-Agena B	2,000	166.4	3,606	3,677	87.3	In orbit: ejected West Ford dipoles, comm tests successful. 100 objects tracked
ERS 5	1963 14B	USAF	May 9	WTR	Atlas-Agena B	.67	165.9	2,927	4,317	87.6	In orbit: returned solar cell damage data for 92 days
ERS 6	1963 14C	USAF	May 9	WTR	Atlas-Agena B	.67	166.4	3,607	3,675	87.3	In orbit: duplicate of ERS 5, returned data for 89 days
Mercury-Atlas 9	1963 15A	NASA	May 15	ETR	Atlas D	1,370	88.5	161	267	32.5	Reentered 5/16/63: Faith 7 with Gordon Cooper recovered after 22 orbits, 34.3 hr; completed Mercury program
None	1963 16A	USAF	May 18	WTR	TAT-Agena D	1,500	91.1	153	497	74.5	Decayed 5/27/63
Kosmos 17	1963 17A	USSR	May 22	Kapustin Yar	SL-7	322	94.8	260	788	49	Decayed 6/2/65
Kosmos 18	1963 18A	USSR	May 24	Tyuratam	SL-3	4,730	89.4	196	288	65.0	Reentered 6/2/63: returned radiation data
None/ERS 7&8	None	USAF	Jun 12	WTR	Atlas-Agena B	2,000/1/1	—	—	—	—	Failed to orbit
None	1963 19A	USAF	Jun 12	WTR	TAT-Agena D	1,500	90.7	192	419	81.9	Decayed 7/11/63

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Vostok 5	1963 20A	USSR	Jun 14	Tyuratam	SL-3	4,720	88.4	162	209	65	Reentered 6/19/63: Valeri Bykovsky landed by parachute after 81 orbits, 119.1 hrs; part of 2nd dual-launch flight (see Vostok 6)
None	1963 21A	USAF	Jun 15	WTR	Thor-Agena D	1,300	95.7	172	919	69.9	Decayed 8/7/63
Lofti 2A	1963 21B	USAF/ USN	Jun 15	WTR	Thor-Agena D	26	95.2	171	925	69.9	Decayed 7/18/63: VLF experiment
Solrad 6	1963 21C	USAF/ USN	Jun 15	WTR	Thor-Agena D	39	95.1	155	590	69.9	Decayed 8/1/63: solar radiation
Radose	1963 21D	USAF/ USN	Jun 15	WTR	Thor-Agena D	25	95.2	175	837	69.9	Decayed 7/30/63: radiation dosimeter payload
None	1963 21E	USAF/ USN	Jun 15	WTR	Thor-Agena D	35	95.0	181	829	69.9	Decayed 7/27/63
Surcal 1C	1963 21F	USAF/ USN	Jun 15	WTR	Thor-Agena D	3	94.9	169	887	69.9	Decayed 7/5/63: surveillance calibration
Transit 5A3	1963 22A	USN	Jun 16	WTR	Scout	55	97.8	610	622	89.9	Navigation. Gravity gradient stabilization system. Decayed 8/3/90
Vostok 6	1963 23A	USSR	Jun 16	Tyuratam	SL-3	4,713	88.3	168	218	65	Reentered 6/19/63: Valentina Tereshkova landed by parachute after 48 orbits, 70.8 hr; passed within 3 mi of Vostok 5
Tiros 7	1963 24A	NASA	Jun 19	ETR	Delta	135	95.9	548	572	58.2	In orbit: provided over 125,000 photos; deactivated 2/3/66
None	1963 25A	USAF	Jun 27	WTR	TAT-Agena D	1,500	90.5	196	396	81.6	Decayed 7/26/63
Hitch-hiker 1	1963 25B	USAF	Jun 27	WTR	TAT-Agena D	79.8	120.3	330	3,060	82.1	In orbit: returned radiation data for more than 3 months
Geophysical Research Satellite	1963 26A	USAF	Jun 28	WI	Scout	99.3	95.4	411	1,311	49.7	Decayed 12/14/83: space gas experiment data ceased after 13 orbits
None	1963 27A	USAF	Jun 29	WTR	TAT Agena B	1,500	94.9	484	536	82.4	Decayed 10/26/69

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	None	USSR	Jul 3	Tyuratam	SL-6	—	—	—	—	—	Luna. Failed to orbit
None	1963 28A	USAF	Jul 12	WTR	Atlas-Agena D	2,000	88.2	164	164	95.4	Decayed 7/18/63: 100th Agena launched
None	1963 29A	USAF	Jul 18	WTR	Thor-Agena D	1,150	89.8	194	387	82.9	Decayed 8/13/63
None/ERS 10	1963 30A	USAF	Jul 18	WTR	Atlas-Agena B	2,000/1.5	167.8	3,680	3.717	88.4	In orbit: failed to eject Environmental Research Satellite
ERS 9	1963 30B	USAF	Jul 18	WTR	Atlas-Agena B	1.5	167.8	3,680	3,717	88.4	In orbit: returned radiation damage data for 111 days
None	1963 30D	USAF	Jul 18	WTR	Atlas-Agena B	1	167.4	3,665	3,745	88.4	Decayed 4/12/71
Syncom 2	1963 31A	NASA	Jul 26	ETR	Delta	39	1,454.0	35,584	36,693	33.1*	In orbit. 1st geosynchronous satellite
None	1963 32A	USAF	Jul 31	WTR	TAT-Agena D	1,500	90.6	157	411	74.7	Decayed 8/11/63
Kosmos 19	1963 33A	USSR	Aug 6	Kapustin Yar	SL-7	355	92.2	267	487	49	Decayed 3/30/64
None	1963 34A	USAF	Aug 24	WTR	TAT-Agena D	1,500	90.5	161	320	75.0	Decayed 9/12/63
None	1963 35A	USAF	Aug 29	WTR	Thor-Agena D	1,000	90.8	292	324	81.9	Decayed 11/7/63
None	1963 35B	USAF	Aug 29	WTR	Thor-Agena D	—	92.0	310	431	81.9	Decayed 9/28/63
None	1963 36A	USAF	Sep 6	WTR	Atlas-Agena D	2,000	89.1	168	263	94.4	Decayed 9/13/63
None	1963 37A	USAF	Sep 23	WTR	TAT-Agena D	1,500	90.6	161	441	74.9	Decayed 10/12/63
None	None	USAF	Sep 27	WTR	Scout	40	—	—	—	—	Failed to orbit
None	1963 38A	USAF/ USN	Sep 28	WTR	Thor-Able Star	—	107.0	1,069	1,104	89.8	In orbit
None	1963 38B	USAF/ USN	Sep 28	WTR	Thor-Able Star	70	107.2	1,067	1,126	89.8	In orbit
None	1963 38C	USAF/ USN	Sep 28	WTR	Thor-Able Star	61	107.2	1,066	1,124	89.8	In orbit: radiation satellite
Vela 1	1963 39A	USAF	Oct 17	ETR	Atlas-Agena D	220	Current elements not maintained				In orbit
ERS 12	1963 39B	USAF	Oct 17	ETR	Atlas-Agena D	2	2,329	220	103,500	36.8	Decayed 7/1/65
Vela 2	1963 39C	USAF	Oct 17	ETR	Atlas-Agena D	220	Current elements not maintained				In orbit
Kosmos 20	1963 40A	USSR	Oct 18	Tyuratam	SL-3	4,730	89.6	205	302	65	Reentered 10/28/63

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos	None	USSR	Oct 24	Kapustin Yar	SL-7						Failed to orbit
None	1963 41A	USAF	Oct 25	WTR	Atlas-Agena D	2,000	90.0	144	332	99.1	Decayed 10/29/63
None	1963 41B	USAF	Oct 25	WTR	Atlas-Agena D	—	88.7	136	297	99.1	Decayed 10/28/63
None	1963 42A	USAF	Oct 29	WTR	TAT-Agena D	1,500	90.9	279	345	89.9	Decayed 1/21/64
None	1963 42B	USAF	Oct 29	WTR	TAT-Agena D	60	93.4	285	585	89.9	Decayed 5/23/65
Polyot 1	1963 43A	USSR	Nov 1	Tyuratam	SL-5	600	93.3	339	592	58.8	Decayed 10/16/82: 1st spacecraft with extensive maneuver capablity
None	None	USAF	Nov 9	WTR	Thor-Agena D	1,150	—	—	—	—	Failed to orbit
Kosmos 21	1963 44A	USSR	Nov 11	Tyuratam	SL-6	890	88.5	182	216	64.8	Decayed 11/14/63
Kosmos 22	1963 45A	USSR	Nov 16	Tyuratam	SL-3	4,780	90.3	192	381	64.9	Reentered 11/22/63
Explorer 18	1963 46A	NASA	Nov 27	ETR	Delta	62	96.3 hrs	192	197,616	33.3	Decayed 12/65: significant radiation data until 5/65 Interplanetary Monitoring Program (IMP A)
Atlas-Centaur 2	1963 47A	NASA	Nov 27	ETR	Atlas-Centaur	4,620	105.8	474	1,586	30.4	In orbit: AC-2 2nd stage, not considered a spacecraft
None	1963 48A	USAF	Nov 27	WTR	Thor-Agena D	1,150	90.1	175	386	70.0	Decayed 12/15/63
None	1963 49A	USAF	Dec 5	WTR	Thor-Able Star	—	106.7	1,060	1,085	90.0	In orbit
None	1963 49B	USAF/ USN	Dec 5	WTR	Thor-Able Star	75	107.0	1,060	1,114	90.0	In orbit: SNAP-9A power supply
None	1963 49C	USAF/ USN	Dec 5	WTR	Thor-Able Star	53	107.0	1,059	1,112	90.0	In orbit
Kosmos 23	1963 50A	USSR	Dec 13	Kapustin Yar	SL-7	347	92.9	240	613	49	Decayed 3/27/64
None	1963 51A	USAF	Dec 18	WTR	Atlas-Agena D	2,000	88.8	122	266	97.9	Decayed 12/20/63
Kosmos 24	1963 52A	USSR	Dec 19	Tyuratam	SL-3	4,730	90.5	204	391	65	Reentered 12/28/63
Explorer 19	1963 53A	NASA	Dec 19	WTR	Scout	7	115.9	590	2,395	78.8	Decayed 5/10/81: 12-foot balloon identical to Explorer 9
Tiros 8	1963 54A	NASA	Dec 21	ETR	Delta	119	98.9	682	725	58.5	In orbit: returned over 100,000 photos; deactivated 7/1/67
None	1963 55A	USAF	Dec 21	WTR	TAT-Agena D	1,500	89.3	176	355	64.9	Decayed 1/8/64
None	1963 55B	USAF	Dec 21	WTR	TAT-Agena D	60	91.7	321	388	64.5	Decayed 11/7/64

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1964 1A	USN/ USA	Jan 11	WTR	TAT-Agena D	700	103.3	904	925	69.9	In orbit
GGSE 1	1964 1B	USN/ USA	Jan 11	WTR	TAT-Agena D	39	103.3	902	924	69.9	In orbit: gravity gradient stabilization experiment
Secor 1	1964 1C	USN/ USA	Jan 11	WTR	TAT-Agena D	18	103.3	903	926	69.9	In orbit: geodetic; pinpointed Pacific islands; deactivated
Solrad 7A	1964 1D	USN/ USA	Jan 11	WTR	TAT-Agena D	45	103.3	902	926	69.9	In orbit: solar radiation; tx until 7/66
Greb	1964 1E	USN/ USA	Jan 11	WTR	TAT-Agena D	—	103.3	903	926	69.9	In orbit
None	1964 2B	USAF	Jan 19	WTR	Thor-Agena D	130	101.1	797	818	99.1	In orbit
None	1964 2C	USAF	Jan 19	WTR	Thor-Agena D	130	101.1	797	822	99.1	In orbit
Relay 2	1964 3A	NASA	Jan 21	ETR	Delta	78	194.7	1,993	7,508	46.3	In orbit: commsat, experiments conducted until 9/26/65
Echo 2	1964 4A	NASA	Jan 25	WTR	Thor-Agena B	256	108.8	1,029	1,316	81.5	Decayed 6/7/69: passive commsat, 1st joint program with USSR
Saturn SA-5	1964 5A	NASA	Jan 29	ETR	Saturn 1	17,100	94.8	264	760	31.5	Decayed 4/30/66: 2nd stage, not considered a spacecraft
Elektron 1	1964 6A	USSR	Jan 30	Tyuratam	SL-3	329	165.0	409	6,761	60.8	In orbit: studied inner Van Allen radiation belt
Elektron 2	1964 6B	USSR	Jan 30	Tyuratam	SL-3	444	1,356.4	9,470	58,952	66.7	In orbit: studied outer belt; 1st dual payload Soviet launch
Ranger 6	1964 7A	NASA	Jan 30	ETR	Atlas-Agena B	361.8	Flight time: 65.6 hours				Hit Moon. TV system malfunctioned, 2/2/64
None	1964 8A	USAF	Feb 15	WTR	TAT-Agena D	1,590	90.9	179	444	75.1	Decayed 3/9/64
Molniya		USSR	Feb 19	Tyuratam	SL-6						Failed to orbit
None	1964 9A	USAF	Feb 25	WTR	Atlas-Agena D	2,000	88.2	173	190	95.7	Decayed 3/1/64
Kosmos 25	1964 10A	USSR	Feb 27	Kapustin Yar	SL-7	355	92.3	255	526	49	Decayed 11/21/64
None	1964 11A	USAF	Feb 28	WTR	TAT-Agena D	1,500	94.6	479	520	82.1	Decayed 2/19/69

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1964 12A	USAF	Mar 11	WTR	Atlas-Agena D	2,000	89.8	163	203	95.8	Decayed 3/16/64
Kosmos 26	1964 13A	USSR	Mar 18	Kapustin Yar	SL-7	365	91	266	387	49	Decayed 9/28/64: radiation; new magnetometer
Beacon/ Explorer A	None	NASA	Mar 19	ETR	Delta	54	—	—	—	—	Failed to orbit: insufficient 3rd stage thrust (Explorer S-66)
Luna	None	USSR	Mar 21*	Tyuratam	SL-6						Lunar probe; failed to orbit
None	None	USAF	Mar 24	WTR	TAT-Agena D	1,500	—	—	—	—	Failed to orbit
Kosmos 27	1964 14A	USSR	Mar 27	Tyuratam	SL-6	6,520	88.7	167	198	64.8	Decayed 3/28/64: probable Venus probe failure
Ariel 2	1964 15A	NASA/ UK	Mar 27	WI	Scout	68	101.3	180	843	51.6	Decayed 11/18/67: returned data from British experiments until 11/64
Zond 1	1964 16D	USSR	Apr 2	Tyuratam	SL-6	890		Heliocentric Orbit			Venus probe, failed to return planetary data
Kosmos 28	1964 17A	USSR	Apr 4	Tyuratam	SL-3	4,730	90.4	213	373	65	Reentered 4/12/64
Gemini-Titan 1	1964 18A	NASA	Apr 8	ETR	Titan II	3,000	89.2	154	299	32.6	Decayed 4/12/64: boilerplate Gemini and 2nd stage
Polyot 2	1964 19B	USSR	Apr 12	Tyuratam	SL-5	600	92.4	242	485	58.1	Decayed 6/8/66: carried out maneuvers 1st day in orbit
Luna	None	USSR	Apr 20	Tyuratam	SL-6						Lunar probe; failed to orbit
None	None	USN	Apr 21	WTR	Thor-Able Star	75	—	—	—	—	Failed to orbit: SNAP 9A power supply
None	1964 20A	USAF	Apr 23	WTR	Atlas-Agena D	2,000	89.4	150	336	103.6	Decayed 4/28/64
Kosmos 29	1964 21A	USSR	Apr 25	Tyuratam	SL-3	4,780	89.5	203	296	65.1	Reentered 5/3/64
None	1964 22A	USAF	Apr 27	WTR	TAT-Agena D	1,500	90.8	178	446	80.0	Decayed 5/26/64
Kosmos 30	1964 23A	USSR	May 18	Tyuratam	SL-3	4,730	90.2	206	366	64.9	Reentered 5/26/64
None	1964 24A	USAF	May 19	WTR	Atlas-Agena D	2,000	89.7	141	380	101.1	Decayed 5/22/64
Saturn SA-6	1964 25A	NASA	May 28	ETR	Saturn I	16,900	88.5	179	204	31.8	Decayed 6/1/64: boilerplate Apollo modules and 2nd stage
None	1964 26A	USN	Jun 4	WTR	Scout	54	102.6	839	914	90.5	In orbit:
Luna	None	USSR	Jun 4**	Tyuratam	SL-6	—	—	—	—	—	Lunar probe; failed to orbit

*May have been Feb 21

**May have been later, Jun 18

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1964 27A	USAF	Jun 4	WTR	TAT-Agena D	1,500	90.2	149	429	80.0	Decayed 6/18/64
Kosmos 31	1964 28A	USSR	Jun 6	Kapustin Yar	SL-7	325	91.6	222	492	49	Decayed 10/20/64
Kosmos 32	1964 29A	USSR	Jun 10	Tyuratam	SL-3	4,730	89.8	213	319	51.3	Reentered 6/18/64
None	1964 30A	USAF	Jun 13	WTR	TAT-Agena D	1,500	91.7	350	364	115.0	Decayed 6/2/65: payload includes Star Flash experiment
None	1964 31A	USAF	Jun 18	WTR	Thor-Agena D	130	101.4	818	827	99.8	In orbit
None	1964 31B	USAF	Jun 18	WTR	Thor-Agena D	130	101.4	819	829	99.8	In orbit
None	1964 32A	USAF	June 19	WTR	TAT-Agena D	1,500	91.0	176	462	85.0	Decayed 7/16/64
Kosmos 33	1964 33A	USSR	Jun 23	Tyuratam	SL-3	4,730	89.4	209	293	65	Reentered 7/1/64
Environmental Sciences Research Satellite	None	USAF	Jun 25	WTR	Scout	79.2	—	—	—	—	Failed to orbit: 2nd stage exploded
Atlas-Centaur 3	None	NASA	Jun 30	ETR	Atlas-Centaur	4,815	—	—	—	—	Failed to orbit: Centaur flight test, not considered a spacecraft
Kosmos 34	1964 34A	USSR	Jul 1	Tyuratam	SL-3	4,730	90	202	348	65	Reentered 7/9/64
None	1964 35A	USAF	Jul 2	WTR	TAT-Agena D	1,500	94.9	501	529	82.1	Decayed 8/7/69
None	1964 36A	USAF	Jul 6	WTR	Atlas-Agena D	2,000	89.4	121	346	92.9	Decayed 7/8/64
None	1964 36B	USAF	Jul 6	WTR	Atlas-Agena D	60	90.9	297	377	93.0	Decayed 1/3/65
None	1964 37A	USAF	Jul 10	WTR	TAT-Agena D	1,500	91.0	180	461	85.0	Decayed 8/6/64
Elektron 3	1964 38A	USSR	Jul 10	Tyuratam	SL-3	350	163.4	405	6,638	60.8	In orbit: monitored inner Van Allen radiation belt
Elektron 4	1964 38B	USSR	Jul 10	Tyuratam	SL-3	444	1,313.4	457	66,261	66.3	Decayed 10/12/83: simultaneously studied Van Allen outer belt magnetosphere
Kosmos 35	1964 39A	USSR	Jul 15	Tyuratam	SL-3	4,730	89.2	218	258	51.3	Reentered 7/23/64
Vela 3	1964 40A	USAF	Jul 17	ETR	Atlas-Agena D	220	Current elements not maintained				In orbit
Vela 4	1964 40B	USAF	Jul 17	ETR	Atlas-Agena D	220	Current elements not maintained				In orbit
ERS 13	1964 40C	USAF	Jul 17	ETR	Atlas-Agena D	12	2,364.	220	105,000	36.7	Decayed 7/1/66

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Ranger 7	1964 41A	NASA	Jul 28	ETR	Atlas-Agena D	362	Flight time: 68.6 hours				Crashed on moon: 1st Ranger success, returned 4,308 photos; tx until 7/31/64
Kosmos 36	1964 42A	USSR	Jul 30	Kapustin Yar	SL-7	325	91.9	261	477	49	Decayed 2/28/65
None	1964 43A	USAF	Aug 5	WTR	TAT-Agena D	1,540	90.5	182	436	80.0	Decayed 8/31/64
Kosmos 37	1964 44A	USSR	Aug 14	Tyuratam	SL-3	4,730	89.5	207	287	65	Reentered 8/22/64
None	1964 45A	USAF	Aug 14	WTR	Atlas-Agena D	2,000	89.0	149	307	95.5	Decayed 8/23/64
None	1964 45B	USAF	Aug 14	WTR	Atlas-Agena D	79	127.4	275	3,748	95.6	Decayed 3/8/79: P-11 radiation
Kosmos 38	1964 46A	USSR	Aug 18	Tyuratam	SL-8	50	95.2	206	769	56.2	Decayed 11/8/64: 1st Soviet triple payload launch
Kosmos 39	1964 46B	USSR	Aug 18	Tyuratam	SL-8	50	95.2	206	798	56.2	Decayed 11/17/64
Kosmos 40	1964 46C	USSR	Aug 18	Tyuratam	SL-8	50	95.2	206	740	56.2	Decayed 11/18/64
Syncom 3	1964 47A	NASA	Aug 19	ETR	TAD*	39	1,407.8	34,191	36,271	0.1**	In orbit
None	1964 48A	USAF	Aug 21	WTR	TAT-Agena D	1,500	91.6	349	363	115.0	Decayed 3/31/65: payload included Star Flash experiment
Kosmos 41	1964 49D	USSR	Aug 22	Tyuratam	SL-6	1,500	714.7	3,294	36,899	71.2	In orbit: investigated geomagnetically trapped protons
Kosmos 42	1964 50A	USSR	Aug 22	Kapustin Yar	SL-7	100	97.8	230	1,113	49	Decayed 12/19/65: 1st double Kosmos launch
Kosmos 43	1964 50C	USSR	Aug 22	Kapustin Yar	SL-7	100	97.8	227	1,100	49	Decayed 12/27/65
Explorer 20	1964 51A	NASA	Aug 25	WTR	Scout	44	103.7	859	1006	79.9	In orbit: returned ionospheric research data until 7/66
Nimbus 1	1964 52A	NASA	Aug 28	WTR	Thor-Agena B	376	98.3	429	937	98.6	Decayed 5/16/74: 27,000 cloud cover photos returned until 9/23/64
Kosmos 44	1964 53A	USSR	Aug 28	Tyuratam	SL-3	3,800	99.0	604	813	65.1	In orbit: probable metsat
Transtage	None	USAF	Sep 1	ETR	Titan IIIA	1,700	—	—	—	—	Failed to orbit: Titan IIIA test, not considered a spacecraft

*Thrust Augmented Delta
**Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Orbiting Geophysical Observatory 1	1964 54A	NASA	Sep 5	ETR	Atlas-Agena B	487	3,838	281	149,385	31.2*	In orbit
Kosmos 45	1964 55A	USSR	Sep 13	Tyuratam	SL-3	4,730	89.7	207	313	64.9	Reentered 9/18/64: weather research film capsule recovered
None	1964 56A	USAF	Sep 14	WTR	TAT-Agena D	1,330	90.8	172	466	85.0	Decayed 10/6/64
Saturn SA-7	1964 57A	NASA	Sep 18	ETR	Saturn I	16,700**	88.4	178	203	31.7	Decayed 9/22/64: boilerplate Apollo modules and 2nd stage
None	1964 58A	USAF	Sep 23	WTR	Atlas-Agena D	2,000	89.0	145	303	92.9	Decayed 9/28/64
Kosmos 46	1964 59A	USSR	Sep 24	Tyuratam	SL-3	4,730	89.2	211	264	51.3	Reentered 10/2/64
Explorer 21	1964 60A	NASA	Oct 4	ETR	Delta	62	35 hrs	190	95,595	33.5	Decayed 1/66: apogee lower than planned, data until 10/13/65 (IMP B)
None	1964 61A	USAF	Oct 5	WTR	TAT-Agena D	1,500	90.4	182	440	80.0	Decayed 10/26/64
Kosmos 47	1964 62A	USSR	Oct 6	Tyuratam	SL-4	5,320	90	174	383	64.8	Decayed 10/7/64: probable manned precursor
None	1964 63B	USAF/ USN	Oct 6	WTR	Thor-Able Star	60	106.2	1,030	1,070	90.9	In orbit
None	1964 63C	USAF/ USN	Oct 6	WTR	Thor-Able Star	1	106.0	1,017	1,050	89.9	In orbit
None	1964 63E	USAF/ USN	Oct 6	WTR	Thor-Able Star	10	106.5	1,050	1,071	90.0	In orbit
None	None	USAF	Oct 8	WTR	Atlas-Agena D	2,000	—	—	—	—	Failed to orbit
Explorer 22	1964 64A	NASA	Oct 10	WTR	Scout	52	104.5	875	1,062	79.7	In orbit: ionospheric and geodetic data
Voskhod 1	1964 65A	USSR	Oct 12	Tyuratam	SL-4	5,320	90.1	177	377	65	Reentered 10/13/64: 1st 3-man crew—Vladimir Komarov, Konstantin Feoktistov, Boris Yegorov; landed after 16 orbits, 24.3 hours

*Initial elements

**Includes launch vehicle weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 48	1964 66A	USSR	Oct 14	Tyuratam	SL-3	4,730	89.4	204	284	65.1	Reentered 10/20/64
None	1964 67A	USAF	Oct 17	WTR	TAT-Agena D	1,500	90.6	189	416	75.0	Decayed 11/4/64
None	1964 68A	USAF	Oct 23	WTR	Atlas-Agena D	2,000	88.6	139	271	95.6	Decayed 10/28/64
None	1964 68B	USAF	Oct 23	WTR	Atlas-Agena D	60	91.1	323	336	95.5	Decayed 2/23/65
Kosmos 49	1964 69A	USSR	Oct 24	Kapustin Yar	SL-7	355	91.8	264	466	49	Decayed 8/21/65: measured earth's IR and UV radiation flux
Kosmos 50	1964 70A	USSR	Oct 28	Tyuratam	SL-3	4,730	88.7	190	230	51.3	Decayed 11/5/64: exploded on 8th day in orbit, 97 pieces
None	1964 71A	USAF	Nov 2	WTR	TAT-Agena D	1,500	90.7	180	448	80.0	Decayed 11/28/64
None	1964 72A	USAF	Nov 4	WTR	TAT-Agena D	1,500	95.0	312	526	82.0	Decayed 11/5/69
Mariner 3	1964 73A	NASA	Nov 5	ETR	Atlas-Agena D	260	448.7 days	1.6150 AU	0.8155 AU	0.524	In solar orbit: shroud failure prevented Mars flyby
Explorer 23	1964 74A	NASA	Nov 6	WI	Scout	134	99.1	466	977	51.9	Decayed 6/29/83. 122 micrometeoroids recorded first year, tx until 7/66
None	1964 75A	USAF	Nov 18	WTR	TAT-Agena D	1,500	89.7	180	339	70.0	Decayed 12/6/64: included Orbiting Radio Beacon Ionospheric Satellite experiment
Explorer 24	1964 76A	NASA	Nov 21	WTR	Scout	8.6	116.3	525	2,498	81.4	Decayed 10/18/68: 12-foot balloon for atmospheric density studies
Explorer 25	1964 76B	NASA	Nov 21	WTR	Scout	40	115.2	524	2401	81.4	In orbit: radiation data until 12/66; 1st NASA dual-payload launch
Mariner 4	1964 77A	NASA	Nov 28	ETR	Atlas-Agena D	260	567.2 days	1.109 AU	1.574 AU		Mars probe. Encountered micrometeoroids, tx ended 12/20/67
Zond 2	1964 78C	USSR	Nov 30	Tyuratam	SL-6	890	Heliocentric Orbit				In solar orbit: Mars probe, failed to return planetary dat
None	1964 79A	USAF	Dec 4	WTR	Atlas-Agena D	2,000	89.7	158	357	97.0	Decayed 12/5/64
Kosmos 51	1964 80A	USSR	Dec 9	Kapustin Yar	SL-7	350	92.5	262	533	48.8	Decayed 11/14/65: measured luminosity of starry sky
Transtage	1964 81A	USAF	Dec 10	ETR	Titan IIIA	4,077	88	157	170	32.0	Decayed 12/13/64: Titan III test, not considered a spacecraft

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Atlas-Centaur 4	1964 82A	NASA	Dec 11	ETR	Atlas-Centaur	2,944	87.9	165	178	30.6	Decayed 12/12/64: Centaur test, not considered a spacecraft
None	1964 83C	USAF/ USN	Dec 13	WTR	Thor-Able Star	78	106.1	1012	1071	89.8	In orbit: returned magnetic field, celestial field UV data
None	1964 83D	USAF/ USN	Dec 13	WTR	Thor-Able Star	60	106.2	1019	1079	89.8	In orbit
San Marco 1	1964 84A	Italy	Dec 15	WI	Scout	254	94.9	198	846	37.8	Decayed 9/13/65: measured atmospheric density
None	1964 85A	USAF	Dec 19	WTR	TAT-Agena D	1,500	90.3	183	410	75.0	Decayed 1/14/65
Explorer 26	1964 86A	NASA	Dec 21	ETR	Delta	46	456.3	316	26,191	20.1*	In orbit
None	1964 87A	USAF	Dec 21	WTR	TAT-Agena D	—	89.4	238	264	70.1	Decayed 1/11/65
Kosmos 52	1965 1A	USSR	Jan 11	Tyuratam	SL-3	4,730	89.5	203	298	65	Reentered 1/19/65
None	1965 2A	USAF	Jan 15	WTR	TAT-Agena D	1,500	90.5	180	420	75.0	Decayed 2/9/65
None	1965 3A	USAF	Jan 19	WTR	Thor-Altair	150	97.7	471	822	98.8	Decayed 7/13/79: 1st use of Thor-Altair
OV1 1	None	USAF	Jan 21	WTR	Atlas D	85	—	—	—	—	Orbiting vehicle launch from side pod of ABRES vehicle failed
Tiros 9	1965 4A	NASA	Jan 22	ETR	Delta	138	119.0	702	2,568	96.4	In orbit: weather; turned off 2/15/67
None	1965 5A	USAF	Jan 23	WTR	Atlas-Agena D	2,000	88.9	146	291	102.5	Decayed 1/28/65
Kosmos 53	1965 6A	USSR	Jan 30	Kapustin Yar	SL-7	310	98.7	218	1,180	48.8	Decayed 8/12/66
OSO 2	1965 7A	NASA	Feb 3	ETR	Delta	247	94.7	434	464	32.9	Orbiting Solar Observatory; returned solar X-ray, gamma ray, UV data until 11/65. Reentered 8/9/89
Titan IIIA3	1965 8A	USAF	Feb 11	ETR	Titan IIIA	3,700	145.4	2,767	2,796	32.1	Vehicle test
LES 1	1965 8C	USAF	Feb 11	ETR	Titan IIIA	31	145.8	2,783	2,803	32.1	In orbit: Lincoln Experimental Satellite; ejected after 3 Transtage burns
Kosmos	None	USSR	Feb 12	Kapustin Yar	SL-7						Failed to orbit
Pegasus 1	1965 9A	NASA	Feb 16	ETR	Saturn I	10,400	97.0	495	733	31.7	Decayed 9/17/78: micrometeoroid; 2,300 sq ft of sensors; silenced 8/68

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Ranger 8	1965 10A	NASA	Feb 17	ETR	Atlas-Agena B	366	Flight time: 64.9 hours				Hit moon 2/20/65 returned 7,137 closeup lunar photos
Kosmos 54	1965 11A	USSR	Feb 21	Tyuratam	SL-8	50	106.2	256	1,729	56.1	Decayed 9/15/68: 2nd Soviet triple payload launch
Kosmos 55	1965 11B	USSR	Feb 21	Tyuratam	SL-8	50	106.2	261	1,753	56.1	Decayed 2/2/68
Kosmos 56	1965 11C	USSR	Feb 21	Tyuratam	SL-8	50	106.2	261	1,687	56.1	Decayed 11/2/67
Kosmos 57	1965 12A	USSR	Feb 22	Tyuratam	SL-4	5,682	91.1	165	427	64.8	Decayed 2/22/65: exploded, probable manned precursor
None	1965 13A	USAF	Feb 25	WTR	TAT-Agena D	1,500	90.1	177	377	75.1	Decayed 3/18/65
Kosmos 58	1965 14A	USSR	Feb 26	Tyuratam	SL-3	4,730	95.2	470	523	65.0	Probable metsat. Decayed 2/25/90
Atlas-Centaur 5	None	NASA	Mar 2	ETR	Atlas-Centaur	951	—	—	—	—	Failed to orbit: Centaur flight test, not considered a spacecraft
Kosmos 59	1965 15A	USSR	Mar 7	Tyuratam	SL-3	4,730	89.7	217	310	65	Reentered 3/15/65
GREB 6	1965 16A	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	40	103.3	896	931	70.1	In orbit: first 8-payload launch
GGSE 2	1965 16B	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	4	103.3	898	932	70.1	In orbit: gravity gradient stabilization experiment
GGSE 3	1965 16C	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	4	103.2	891	926	70.1	In orbit: gravity gradient stabilization experiment
Solrad 7B	1965 16D	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	47	103.4	900	933	70.1	In orbit: solar radiation
Secor 3	1965 16E	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	18	103.3	898	932	70.1	In orbit: geodetic; deactivated
Oscar 3	1965 16F	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	14	103.1	884	917	70.1	In orbit: 3rd amateur ``ham'' radio, tx'd for 16 days - (EGRS-3)
Surcal	1965 16G	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	5	103.5	901	945	70.1	Decayed 3/27/81: surveillance calibration for Spasur system
Dodecahedron	1965 16H	USN/USA/ USAF	Mar 9	WTR	Thor-Agena D	4	103.4	898	935	70.1	In orbit: ``Dodecahedron'' surveillance calibration

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1965 17A	USN/ USA	Mar 11	WTR	Thor-Able Star	60	95.1	211	890	89.9	Decayed 6/14/65
Secor 2	1965 17B	USN/ USA	Mar 11	WTR	Thor-Able Star	18	98.0	296	1,014	89.9	Decayed 2/26/68: geodetic; failed to operate as planned
Kosmos 60	1965 18A	USSR	Mar 12	Tyuratam	SL-6	6,530	89.1	195	248	64.7	Decayed 3/17/65: probable lunar probe failure
None	1965 19A	USAF	Mar 12	WTR	Atlas-Agena D	2,000	88.8	93	155	247.6	Decayed 3/17/65
Kosmos 61	1965 20A	USSR	Mar 15	Tyuratam	SL-8	50	106	262	1,738	56	Decayed 1/15/68: 3rd triple payload Kosmos launch
Kosmos 62	1965 20B	USSR	Mar 15	Tyuratam	SL-8	50	106	257	1,715	56	Decayed 9/24/68
Kosmos 63	1965 20C	USSR	Mar 15	Tyuratam	SL-8	50	106	262	1,672	56	Decayed 11/4/67
None	1965 21A	USAF	Mar 18	WTR	Thor-Altair	130	94.4	442	533	99.0	Decayed 12/31/89
Voskhod 2	1965 22A	USSR	Mar 18	Tyuratam	SL-4	5,682	90.9	167	475	65	Reentered 3/19/65: Alexei Leonov spent 20 min outside spacecraft; landed with Pavel Belyayev after 17 orbits, 26.0 hours
Ranger 9	1965 23A	NASA	Mar 21	ETR	Atlas-Agena B	366	Flight time: 64.5 hours				Hit moon 3/24/65. 5,814 photos, landed in crater Alphonsus
Gemini 3	1965 24A	NASA	Mar 23	ETR	Titan II	3,220	88.2	160	240	32.5	Reentered 3/23/65: 1st manned orbital maneuvers, Virgil Grissom, John Young landed after 3 orbits, 4.9 hours
Kosmos 64	1965 25A	USSR	Mar 25	Tyuratam	SL-4	—	89.2	201	267	65	Reentered 4/2/65
None	1965 26A	USAF	Mar 25	WTR	TAT-Agena D	1,500	89.1	186	265	96.1	Decayed 4/4/65
Snapshot	1965 27A	USAF/ USA	Apr 3	WTR	Atlas-Agena D	440	111.4	1,268	1,317	90.2	In orbit: SNAP-10A operated at more than 500w for 43 days. Since 1979, many objects separating
Secor 4	1965 27B	USAF/ USA	Apr 3	WTR	Atlas-Agena D	40	111.4	1,282	1,313	90.3	In orbit: geodetic; failed to operate as planned

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Early Bird (Intelsat I)	1965 28A	CSC*	Apr 6	ETR	TAD	39	1,437	35,003	36,606	0.1**	In orbit over Atlantic: commercial comm service began 6/28/65: switched off 1/69. Reactivated for temporary service 6/29/69; deactivated 8/13/69
Luna	None	USSR	Apr 10	Tyuratam	SL-6						Lunar probe; failed to orbit
Kosmos 65	1965 29A	USSR	Apr 17	Tyuratam	SL-3	4,730	89.8	207	319	65	Reentered 4/25/65: weather research film capsule recovered
Molniya 1A	1965 30A	USSR	Apr 23	Tyuratam	SL-6	1,750	708	538	39,300	65	Decayed 8/16/79: 1st Soviet commsat, period adjusted to 12 hrs
None	1965 31A	USAF	Apr 28	WTR	Atlas-Agena D	2,000	88.7	180	259	95.7	Decayed 5/3/65
None	1965 31B	USAF	Apr 28	WTR	Atlas-Agena D	60	95.0	490	559	95.3	Decayed 10/31/69
Explorer 27	1965 32A	NASA	Apr 29	WI	Scout	59.7	107.8	933	1,315	41.2	In orbit: geodetic and ionospheric research; battery failed 1968
None	1965 33A	USAF	Apr 29	WTR	TAT-Agena D	1,500	91.0	178	473	85.0	Decayed 5/26/65
LES 2	1965 34B	USAF	May 6	ETR	Titan IIIA	37	309.9	2,799	14,802	32.2	In orbit: experimental commsat launched by last Titan IIIA
LCS 1	1965 34C	USAF	May 6	ETR	Titan IIIA	34	145.6	2,786	2,796	32.1	In orbit: passive aluminum sphere for radar calibration studies
Kosmos 66	1965 35A	USSR	May 7	Tyuratam	SL-3	4,730	89.3	202	282	65	Reentered 5/15/65
Luna 5	1965 36A	USSR	May 9	Tyuratam	SL-6	1,474	Flight time: 82.2 hours				Hit moon 5/12/65. 1st USSR soft landing attempt failed
None	1965 37A	USAF	May 18	WTR	TAT-Agena D	1,500	89.7	198	331	75.0	Decayed 6/15/65
None	1965 38A	USAF	May 20	WTR	Thor-Altair	130	98.7	527	829	98.2	In orbit
Pegasus 2	1965 39A	NASA	May 25	ETR	Saturn I	10,464	97.3	502	740	31.7	Decayed 11/3/79: meteoroid detection; silenced 8/68
Kosmos 67	1965 40A	USSR	May 25	Tyuratam	SL-3	4,730	89.9	200	346	51.8	Reentered 6/2/65
None	1965 41A	USAF	May 27	WTR	Atlas-Agena D	2,000	88.7	149	267	95.8	Decayed 6/1/65
OV1 3	None	USAF	May 27	WTR	Atlas D	92	—	—	—	—	Failed to orbit: scientific satellite, launch vehicle exploded

*Communications Satellite Corporation
**Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Explorer 28	1965 42A	NASA	May 29	ETR	Delta	58.3	8550	190	264,000	33.9	Decayed 7/4/68: returned magnetic fields, radiation data (IMP C)
Gemini 4	1965 43A	NASA	Jun 3	ETR	Titan II	3,569	89.0	162	281	32.0	Reentered 6/7/65: Edward White performed 21-min EVA, landed with James McDivitt after 66 orbits, 97.9 hrs
Luna 6	1965 44A	USSR	Jun 8	Tyuratam	SL-6	1,440	Heliocentric Orbit				Lunar soft lander, missed Moon by 100,000 mi
None	1965 45A	USAF	Jun 9	WTR	TAT-Agena D	1,500	89.9	176	362	75.1	Decayed 6/22/65
Kosmos 68	1965 46A	USSR	Jun 15	Tyuratam	SL-3	4,730	89.8	209	315	65	Reentered 6/23/65
Transtage	1965 47A	USAF	Jun 18	ETR	Titan IIIC	9,694	88.1	167	193	32.2	Decayed 6/29/65: Titan IIIC test, not considered a spacecraft
None	1965 48A	USN	Jun 24	WTR	Thor-Able Star	61	106.7	1,016	1,131	89.9	In orbit: augmented operational navsat system
Kosmos 69	1965 49A	USSR	Jun 25	Tyuratam	SL-3	4,730	89.7	212	305	65	Reentered 7/3/65
None	1965 50A	USAF	Jun 25	WTR	Atlas-Agena D	60	94.7	496	510	107.7	Decayed 8/22/68
None	1965 50B	USAF	Jun 25	WTR	Atlas-Agena D	2,000	88.8	151	283	107.6	Decayed 6/30/65
Tiros 10	1965 51A	NASA	Jul 2	ETR	Delta	127	100.3	728	817	98.4	In orbit: abandoned 7/3/67
Kosmos 70	1965 52A	USSR	Jul 2	Kapustin Yar	SL-7	250	98.3	215	1,147	48.8	Decayed 12/18/66
None	None	USAF	Jul 12	WTR	Atlas-Agena D	2,000	—	—	—	—	Failed to orbit: destroyed by range safety officer
None	None	USSR	Jul 13	Tyuratam	SL-3						Failed to orbit
Kosmos 71	1965 53A	USSR	Jul 16	Tyuratam	SL-8	50	95.5	522	542	56.1	Decayed 8/11/70: 1st Soviet five-satellite payload launch
Kosmos 72	1965 53B	USSR	Jul 16	Tyuratam	SL-8	50	95.5	538	588	56.1	Decayed 8/24/79
Kosmos 73	1965 53C	USSR	Jul 16	Tyuratam	SL-8	50	95.5	538	556	56.1	Decayed 3/20/74
Kosmos 74	1965 53D	USSR	Jul 16	Tyuratam	SL-8	50	95.5	338	616	56.1	Decayed 12/13/79
Kosmos 75	1965 53E	USSR	Jul 16	Tyuratam	SL-8	50	95.5	540	644	56.1	Decayed 9/28/79
Proton 1	1965 54A	USSR	Jul 16	Tyuratam	SL-9	12,200	92.5	183	589	63.5	Decayed 10/11/65: physics "lab," heaviest Soviet payload to date
None	1965 55A	USAF	Jul 16	WTR	TAT-Agena D	1,500	94.4	471	512	70.2	Decayed 12/18/68
Zond 3	1965 56A	USSR	Jul 18	Tyuratam	SL-6	959	Heliocentric Orbit				Re-transmitted photos taken during lunar flyby

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1965 57A	USAF	Jul 19	WTR	TAT-Agena D	1,500	90.9	182	464	85.1	Decayed 8/18/65
Vela 5	1965 58A	USAF	Jul 20	ETR	Atlas-Agena D	235	Current elements not maintained				In orbit: experimental nuclear test detection
Vela 6	1965 58B	USAF	Jul 20	ETR	Atlas-Agena D	235	Current elements not maintained				In orbit: lags Vela 5 by 180 degrees
ERS 17	1965 58C	USAF	Jul 20	ETR	Atlas-Agena D	5.4	2,608.8	153	112,694	34.4	Decayed 7/1/68: monitored radiation for 104 days
Kosmos 76	1965 59A	USSR	Jul 23	Kapustin Yar	SL-7	325	92.2	256	513	48.8	Decayed 3/16/68
Pegasus 3	1965 60A	NASA	Jul 30	ETR	Saturn I	10,500	95.3	535	567	28.9	Decayed 8/4/69: meteoroid detection satellite, silenced 8/68
Kosmos 77	1965 61A	USSR	Aug 3	Tyuratam	SL-3	4,730	89.3	201	280	51.8	Reentered 8/11/65
None	1965 62A	USAF	Aug 3	WTR	Atlas-Agena D	2,000	89.1	149	307	107.5	Decayed 8/7/65
None	1965 62B	USAF	Aug 3	WTR	Atlas-Agena D	60	94.7	501	515	107.4	Decayed 6/17/68
Secor 5	1965 63A	USA	Aug 10	WI	Scout	24	122.2	1,136	2,418	69.2	In orbit: Scout flight test carried geodetic
Atlas-Centaur 6	1965 64A	NASA	Aug 11	ETR	Atlas-Centaur	950	31 days	Barycentric Orbit			Surveyor model launched to simulated Moon
None	1965 65A	USN	Aug 13	WTR	Thor-Able Star	—	107.8	1,072	1,177	90.0	In orbit
Surcal	1965 65B	USN	Aug 13	WTR	Thor-Able Star	—	107.7	1,086	1,147	90.0	In orbit: failed to separate from 2nd stage; failed to deploy 200 ft antenna
Surcal	1965 65C	USN	Aug 13	WTR	Thor-Able Star	4	106.8	1,010	1,111	90.0	In orbit: ``dodacahedron,'' extended twelve 25-ft antennas
Surcal	1965 65E	USN	Aug 13	WTR	Thor-Able Star	9	108.0	1,079	1,180	90.0	In orbit: ``tempsat,'' 14-inch sphere painted dull black
None	1965 65F	USN	Aug 13	WTR	Thor-Able Star	61	108.0	1,077	1,186	90.0	In orbit: navigation; augmented USN system
Surcal	1965 65H	USN	Aug 13	WTR	Thor-Able Star	2	108.0	1,076	1,184	90.0	In orbit: 14-inch white sphere to check Spasur system
Surcal	1965 65L	USN	Aug 13	WTR	Thor-Able Star	—	108.0	1,079	1,189	90.0	In orbit: rectangular package with beacon transmitter
Kosmos 78	1965 66A	USSR	Aug 14	Tyuratam	SL-3	4,730	89.9	218	298	69	Reentered 8/22/65
None	1965 67A	USAF	Aug 17	WTR	TAT-Agena D	1,500	90.4	180	407	70.0	Decayed 10/11/65

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Gemini 5	1965 68A	NASA	Aug 21	ETR	Titan II	3,600	89.5	197	303	32.8	Reentered 8/29/65: 1st extended U.S. manned flight, Gordon Cooper, Charles Conrad landed after 128 orbits, 190.9 hrs
REP	1965 68C	NASA	Aug 21	ETR	Titan II	34	89.2	168	314	32.6	Decayed 8/27/65: radar evaluation pod ejected from Gemini 5
Kosmos 79	1965 69A	USSR	Aug 25	Tyuratam	SL-3	4,730	90	205	338	64.9	Reentered 9/2/65
OSO C	None	NASA	Aug 25	ETR	Delta	280	—	—	—	—	Failed to orbit: premature 3rd stage ignition
None	None	USAF	Sep 2	WTR	Thor-Agena D	1,150	—	—	—	—	Failed to orbit: destroyed by range safety officer
Kosmos 80	1965 70A	USSR	Sep 3	Tyuratam	SL-8	50	115.0	1,366	1,540	56.1	In orbit: 2nd Kosmos five-payload launch
Kosmos 81	1965 70B	USSR	Sep 3	Tyuratam	SL-8	50	115.3	1,392	1,547	56.1	In orbit
Kosmos 82	1965 70C	USSR	Sep 3	Tyuratam	SL-8	50	115.7	1,415	1,554	56.1	In orbit
Kosmos 83	1965 70D	USSR	Sep 3	Tyuratam	SL-8	50	116.0	1,443	1,561	56.1	In orbit
Kosmos 84	1965 70E	USSR	Sep 3	Tyuratam	SL-8	50	116.4	1,469	1,569	56.1	In orbit
Kosmos 85	1965 71A	USSR	Sep 9	Tyuratam	SL-3	4,730	89.6	204	297	65	Reentered 9/17/65
None	1965 72A	USAF	Sep 10	WTR	Thor-Altair	—	101.5	639	1,013	99.0	In orbit
Kosmos 86	1965 73A	USSR	Sep 18	Tyuratam	SL-8	50	115.0	1,287	1,627	56.1	In orbit: 3rd Kosmos five-payload launch
Kosmos 87	1965 73B	USSR	Sep 18	Tyuratam	SL-8	50	115.5	1,311	1,639	56.1	In orbit
Kosmos 88	1965 73C	USSR	Sep 18	Tyuratam	SL-8	50	115.8	1,335	1,650	56.1	In orbit
Kosmos 89	1965 73D	USSR	Sep 18	Tyuratam	SL-8	50	116.2	1,362	1,660	56.1	In orbit
Kosmos 90	1965 73E	USSR	Sep 18	Tyuratam	SL-8	50	116.7	1,388	1,671	56.1	In orbit
None	1965 74A	USAF	Sep 22	WTR	TAT-Agena D	1,500	90.0	204	324	80.0	Decayed 10/11/65
Kosmos 91	1965 75A	USSR	Sep 23	Tyuratam	SL-3	4,730	89.8	158	264	65	Reentered 10/1/65
None	1965 76A	USAF	Sep 30	WTR	Atlas-Agena D	2,000	88.8	96	164	95.6	Decayed 10/5/65
Luna 7	1965 77A	USSR	Oct 4	Tyuratam	SL-6	1,504	Flight time: 86.1 hours				Crashed on Moon 10/7/65: retros fired early, soft landing failed
OV1 2	1965 78A	USAF	Oct 5	WTR	Atlas D	86	121.5	409	2.995	144.3	In orbit: 1st successful OV1, returned radiation data

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1965 79A	USAF	Oct 5	WTR	TAT-Agena D	1,500	89.8	203	323	75.1	Decayed 10/29/65
Molniya 1B	1965 80A	USSR	Oct 14	Tyuratam	SL-6	1,750	719	481	39,935	65	Decayed 3/17/67: 2nd Soviet commsat, USSR- France comm link
OGO 2	1965 81A	NASA	Oct 14	WTR	TAT-Agena D	507	95.4	415	1,517	87.3	Decayed 9/17/81: geophysical, deactivated 2/68
OV2 1/LCS 2	1965 82A	USAF	Oct 15	ETR	Titan IIIC	170/34	99.7	706	792	32.6	Decayed 7/27/72: transtage broke up, failed to release payloads
Kosmos 92	1965 83A	USSR	Oct 16	Tyuratam	SL-3	4,730	89.9	201	334	65	Reentered 10/24/65: weather research film capsule recovered
Kosmos 93	1965 84A	USSR	Oct 19	Kapustin Yar	SL-7	305	91.7	216	513	48.4	Decayed 1/3/66
Gemini 6/Target	None	NASA	Oct 25	ETR	Atlas-Agena D	3,261	—	—	—	—	Failed to orbit: Agena exploded 6 min after launch
Kosmos 94	1965 85A	USSR	Oct 28	Tyuratam	SL-3	4,730	89.3	205	271	65	Reentered 11/5/65
None	1965 86A	USAF	Oct 28	WTR	TAT-Agena D	1,500	90.6	176	430	75.0	Decayed 11/17/65
Proton 2	1965 87A	USSR	Nov 2	Tyuratam	SL-9	12,200	92.6	189	608	63.5	Decayed 2/6/66: complex high-energy physics laboratory
Kosmos 95	1965 88A	USSR	Nov 4	Kapustin Yar	SL-7	325	91.7	211	521	48.4	Decayed 1/18/66: payload broke up 3rd day in orbit
Explorer 29	1965 89A	NASA	Nov 6	ETR	TAD	175	120.3	1,114	2,273	59.4	In orbit: GEOS geodetic satellite; inactive
None	1965 90A	USAF	Nov 8	WTR	Atlas-Agena D	—	88.7	145	277	93.9	Decayed 11/11/65
None	1965 90B	USAF	Nov 8	WTR	Atlas-Agena D	2,000	88.9	155	284	93.9	Decayed 11/9/65
Venera 2	1965 91A	USSR	Nov 12	Tyuratam	SL-6	962	Heliocentric Orbit				Passed Venus 2/27/66, failed to return data
Venera 3	1965 92A	USSR	Nov 16	Tyuratam	SL-6	958	Flight time: 105 days				Crashed on Venus 3/1/66: failed to return planetary data
Explorer 30	1965 93A	USN/ NASA	Nov 19	WI	Scout	57	100.5	680	877	59.7	In orbit: solar radiation; final IQSY monitor; inactive
Kosmos 96	1965 94A	USSR	Nov 23	Tyuratam	SL-6	6,510	89.6	210	269	51.9	Decayed 12/9/65: suspected Venus probe left in parking orbit

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Kosmos 97	1965 95A	USSR	Nov 26	Kapustin Yar	SL-7	267	108.3	213	2,144	49	Decayed 4/2/67: payload included ammonia freq standard
A 1	1965 96A	France	Nov 26	Hammaguir	Diamant	42	108.1	530	1,736	34.3	In orbit: 1st French; tx'd for 2 days
Kosmos 98	1965 97A	USSR	Nov 27	Tyuratam	SL-3	4,730	92	205	547	65	Reentered 12/5/65
Alouette 2	1965 98A	Canada	Nov 29	WTR	Thor-Agena B	145	119.8	503	2,800	79.8	In orbit: ionospheric research
Explorer 31	1965 98B	NASA	Nov 29	WTR	Thor-Agena B	99	120.7	502	2.906	79.8	In orbit: returned ionospheric data, complementing Alouette
Luna 8	1965 99A	USSR	Dec 3	Tyuratam	SL-6	1,550	Flight time: 83.1 hours				Hit moon 12/6/65: retro-rockets fired late, soft landing failed
Gemini 7	1965 100A	NASA	Dec 4	ETR	Titan II	3,658	89.2	100	204	28.9	Reentered 12/18/65: Frank Borman, James Lovell went record 220 orbits, 330.6 hr; served as Gemini 6 rendezvous target
FR 1	1965 101A	France	Dec 6	WTR	Scout	60	99.3	717	728	75.9	In orbit: VLF wave propagation research; inactive
None	1965 102A	USAF	Dec 9	WTR	TAT-Agena D	1,500	90.5	183	437	80.0	Decayed 12/26/65
Kosmos 99	1965 103A	USSR	Dec 10	Tyuratam	SL-3	4,730	89.6	203	309	65	Reentered 12/18/65
Gemini 6	1965 104A	NASA	Dec 15	ETR	Titan II	3,546	88.5	258	271	28.9	Reentered 12/16/65: Wally Schirra, Thomas Stafford rendezvoused within 1 ft of Gemini 7, landed after 17 orbits, 25.9 hrs
Pioneer 6	1965 105A	NASA	Dec 16	ETR	TAD	63.4	311.3 days	0.814 AU	0.985 AU	0.1695	In solar orbit: returning good data
Kosmos 100	1965 106A	USSR	Dec 17	Tyuratam	SL-3	3,800	76.7	533	641	660	In orbit: probable metsat
Kosmos 101	1965 107A	USSR	Dec 21	Kapustin Yar	SL-7	325	92.4	254	539	49	Decayed 7/12/66
OV2 3	1965 108A	USAF	Dec 21	ETR	Titan IIIC	193	589.2	167	33.662	26.3	Decayed 8/17/75: transtage separation failed
LES 4	1965 108B	USAF	Dec 21	ETR	Titan IIIC	52	589.2	189	33,632	26.6	Decayed 8/1/77: experimental all-solid-state commsat, tx in X-band
Oscar 4	1965 108C	USAF	Dec 21	ETR	Titan IIIC	13	587.4	162	33,561	26.8	Decayed 4/12/76: 4th amateur radio commsat

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
LES 3	1965 108D	USAF	Dec 21	ETR	Titan IIIC	16	581.4	195	33,177	26.4	Decayed 4/6/68: radio signal generator for commsat system tests
None	1965 109A	USN	Dec 21	WTR	Scout	60	104.8	898	1,066	89.1	In orbit
None	1965 110A	USAF	Dec 24	WTR	TAT-Agena D	1,500	90.7	178	446	80.0	Decayed 1/20/66
Kosmos 102	1965 111A	USSR	Dec 27	Tyuratam	SL-10	4,700	89.2	203	269	65	Decayed 1/13/66
Kosmos 103	1965 112A	USSR	Dec 28	Tyuratam	SL-8	875	95.2	474	495	56	52nd Kosmos orbited in 1965. Decayed 1/2/90
None	None	USAF	Jan 6	WTR	Thor-Altair	130	—	—	—	—	Failed to orbit
Kosmos 104	1966 1A	USSR	Jan 7	Tyuratam	SL-3	4,730	90.2	193	380	65	Reentered 1/15/66
None	1966 2A	USAF	Jan 19	WTR	Atlas-Agena D	2,000	88.7	150	269	93.9	Decayed 1/25/66
None	1966 2B	USAF	Jan 19	WTR	Atlas-Agena D	—	87.6	154	246	93.8	Decayed 1/23/66
Kosmos 105	1966 3A	USSR	Jan 22	Tyuratam	SL-3	4,730	89.7	204	310	65	Reentered 1/30/66
Kosmos 106	1966 4A	USSR	Jan 25	Kapustin Yar	SL-7	325	92.8	281	553	48.4	Decayed 11/14/66
None	1966 5A	USN	Jan 28	WTR	Scout	50	105.6	852	1,195	89.8	In orbit
Luna 9	1966 6A	USSR	Jan 31	Tyuratam	SL-6	1,580	Flight time: 79.0 hours				Landed on Moon 2/3/66: returned photos of lunar surface for 3 days
None	1966 7A	USAF	Feb 2	WTR	TAT-Agena D	1,500	90.6	185	425	75.1	Decayed 2/27/66
ESSA 1	1966 8A	ESSA	Feb 3	ETR	Delta	138	100.0	689	818	97.9	In orbit: first operational Environmental Survey Satellite switched off 5/8/67
None	1966 9A	USAF	Feb 9	WTR	TAT-Agena D	1,500	94.8	508	512	82.1	Decayed 9/26/69
Kosmos 107	1966 10A	USSR	Feb 10	Tyuratam	SL-3	4,730	89.7	204	310	65	Reentered 2/18/66
Kosmos 108	1966 11A	USSR	Feb 11	Kapustin Yar	SL-7	355	95.3	219	855	48.9	Decayed 11/21/66
None	1966 12A	USAF	Feb 15	WTR	Atlas-Agena D	2,000	89.0	148	293	96.5	Decayed 2/22/66
None	1966 12B	USAF	Feb 15	WTR	Atlas-Agena D	9	88.1	115	253	96.5	Decayed 2/16/66
None	1966 12C	USAF	Feb 15	WTR	Atlas-Agena D	4	88.7	149	267	96.5	Decayed 2/22/66
D 1A	1966 13A	France	Feb 17	Hammaguir	Diamant	19	117.2	503	2,576	34.1	In orbit: 3rd French; geodetic data research

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 109	1966 14A	USSR	Feb 19	Tyuratam	SL-3	4,730	89.5	202	295	65	Reentered 2/27/66
Kosmos 110	1966 15A	USSR	Feb 22	Tyuratam	SL-4	5,700	95.3	190	882	51.9	Reentered 3/16/66: 2 dogs recovered after 330 orbits
ESSA 2	1966 16A	ESSA	Feb 28	ETR	TAD	132	113.4	1352	1,412	101.2	In orbit: completed initial ESSA global system, APT cameras
Kosmos 111	1966 17A	USSR	Mar 1	Tyuratam	SL-6	6,540	88.6	182	194	51.9	Decayed 3/3/66: suspected lunar probe failure
None	1966 18A	USAF	Mar 9	WTR	TAT-Agena D	1,500	90.6	178	432	75.0	Decayed 3/29/66
Gemini 8/ Target	1966 19A	NASA	Mar 16	ETR	Atlas-Agena D	3,175	90.4	285	298	28.9	Decayed 9/15/67: target vehicle for first docking in space
Gemini 8	1966 20A	NASA	Mar 16	ETR	Titan II	3,789	88.8	159	265	28.9	Docked w/ target 3/16. Stuck thruster forced early landing after 6.5 orbits, 10.7 hrs. Neil Armstrong, David Scott reentered 3/16/66
Kosmos 112	1966 21A	USSR	Mar 17	Plesetsk	SL-3	4,730	92.1	207	545	72	Reentered 3/25/66: new USSR launch site
None	1966 22A	USAF	Mar 18	WTR	Atlas-Agena D	2,000	89.0	162	308	101.0	Decayed 3/24/66
None	1966 22B	USAF	Mar 18	WTR	Atlas-Agena D	—	88.2	152	284	100.9	Decayed 3/23/66
Kosmos 113	1966 23A	USSR	Mar 21	Tyuratam	SL-3	4,730	89.6	207	313	65	Reentered 3/29/66
Proton	None	USSR	Mar 24	Tyuratam	SL-9						Failed to orbit
None	1966 24A	USN	Mar 26	WTR	Scout	50	105.1	885	1,104	89.9	In orbit
Molniya	None	USSR	Mar 27	Tyuratam	SL-6						Failed to orbit
OV1 4	1966 25A	USAF	Mar 30	WTR	Atlas D	87.6	104.1	887	1,011	144.5	In orbit: returned zero-g, thermal control experiment data
OV1 5	1966 25B	USAF	Mar 30	WTR	Atlas D	114	105.6	987	1,058	144.6	In orbit: optical radiation test, gravity-gradient stabilized
None	1966 26A	USAF	Mar 30	WTR	Thor-Altair	130	99.9	613	883	98.5	In orbit
Luna 10	1966 27A	USSR	Mar 31	Tyuratam	SL-6	1,597	Selenocentric Orbit				Lunar and circumlunar data until 5/30/66
Kosmos 114	1966 28A	USSR	Apr 6	Plesetsk	SL-3	4,730	90.1	210	343	73	Reentered 4/14/66
None	1966 29A	USAF	Apr 7	WTR	TAT-Agena D	1,500	89.6	193	312	75.1	Decayed 4/26/66

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Atlas-Centaur 8	1966 30A	NASA	Apr 7	ETR	Atlas-Centaur	784	89.6	175	334	30.8	Decayed 5/5/66: Centaur test, not considered a spacecraft
OAO 1	1966 31A	NASA	Apr 8	ETR	Atlas-Agena D	1,774	100.8	788	800	35.0	In orbit: Orbiting Astronomy Observatory battery failed second day in orbit
None	1966 32A	USAF	Apr 19	WTR	Atlas-Agena D	2,000	89.6	139	312	116.9	Decayed 4/26/66
Kosmos 115	1966 33A	USSR	Apr 20	Tyuratam	SL-3	4,730	89.3	201	294	65	Reentered 4/28/66
OV3 1	1966 34A	USAF	Apr 22	WTR	Scout	69	138.7	341	4,658	82.4	In orbit: radiation research; deactivated
Molniya 1C	1966 35A	USSR	Apr 25	Tyuratam	SL-6	1,750	710	506	39.492	64.5	Decayed 6/11/73: commsat, also tx'd cloud cover photos
Kosmos 116	1966 36A	USSR	Apr 26	Kapustin Yar	SL-7	325	92	289	451	48.4	Decayed 12/3/66
Luna	None	USSR	Apr 30	Tyuratam	SL-6						Lunar probe; failed to orbit
None	None	USAF	May 3	WTR	TAT-Agena D	1,500	—	—	—	—	Failed to orbit
Kosmos 117	1966 37A	USSR	May 6	Tyuratam	SL-3	4,730	89.5	205	298	65	Reentered 5/14/66
Kosmos 118	1966 38A	USSR	May 11	Tyuratam	SL-3	4,730	94.8	415	428	65	Probable metsat. Decayed 11/23/88
None	1966 39A	USAF	May 14	WTR	Atlas-Agena D	2,000	89.4	133	358	110.5	Decayed 5/21/66
None	1966 39B	USAF	May 14	WTR	Atlas-Agena D	60	95.4	517	559	109.9	Decayed 10/27/70
Nimbus 2	1966 40A	NASA	May 15	WTR	TAT-Agena B	414	108.0	1092	1,175	100.4	In orbit: returned TV, IR cloud cover photos; silenced 1/18/69
Gemini 9/ Target A	None	NASA	May 17	ETR	Atlas-Agena D	3,248	—	—	—		Failed to orbit: Atlas control system malfunction
Kosmos	None	USSR	May 17	Tyuratam	SL-3	4,730					Failed to orbit
None	1966 41A	USN	May 19	WTR	Scout	50	103.1	843	959	89.9	In orbit
None	1966 42A	USAF	May 24	WTR	TAT-Agena D	1,500	89.0	179	271	66.0	Decayed 6/9/66
Kosmos 119	1966 43A	USSR	May 24	Kapustin Yar	SL-7	250	99.8	208	1,292	48.5	Decayed 11/30/66
Explorer 32	1966 44A	NASA	May 25	ETR	Delta	225	99.3	289	2,716	64.5	Decayed 2/22/85. 6 aeronomy experiments returned data until 12/66
Surveyor 1	1966 45A	NASA	May 30	ETR	Atlas-Centaur	269	Flight time: 63.6 hours				Landed on Moon 6/2/66: tx'd 11,150 photos up to 7/13/66

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Gemini 9/ Target B	1966 46A	NASA	Jun 1	ETR	Atlas D	794	90.4	292	296	28.9	Decayed 7/11/66: ATDA fairing separation failed
Gemini 9	1966 47A	NASA	Jun 3	ETR	Titan II	3,750	88.8	270	272	28.9	Reentered 6/6/66: rendezvous and EVA tests carried out by Thomas Stafford and Eugene Cernan; landed after 47 orbits, 72.3 hrs
None	1966 48A	USAF	Jun 3	WTR	Atlas-Agena D	2,000	88.4	143	288	86.9	Decayed 6/9/66
None	1966 48B	USAF	Jun 3	WTR	Atlas-Agena D	—	88.3	136	281	87.0	Decayed 6/9/66
OGO 3	1966 49A	NASA	Jun 7	ETR	Atlas-Agena B	634	2,915	319	122,173*	31.4	In orbit: 20 experiments returned geophysical data; deactivated
Kosmos 120	1966 50A	USSR	Jun 8	Tyuratam	SL-3	4,730	89.4	205	285	51.8	Reentered 6/16/66
None	1966 51A	USAF/ USA	Jun 9	WTR	Atlas-Agena D	2,000	124.8	174	3,616	90.1	Decayed 12/3/66
Secor 6	1966 51B	USAF/ USA	Jun 9	WTR	Atlas-Agena D	17	125.1	168	3,648	90.1	Decayed 7/6/67: geodetic
ERS 16	1966 51C	USAF/ USA	Jun 9	WTR	Atlas-Agena D	15	125.0	179	3,623	90.0	Decayed 3/12/67: carried 5 metal-to-metal bonding expmnts.
OV3 4	1966 52A	USAF	Jun 10	WI	Scout	78.5	143.0	647	4,711	40.9	In orbit: radiation research; deactivated
GGTS 1	1966 53A	USAF	Jun 16	ETR	Titan IIIC	47	Current elements not maintained				In orbit: gravity gradient test, 2 booms deployed
IDCSP 1	1966 53B	USAF	Jun 16	ETR	Titan IIIC	45	Current elements not maintained				In orbit: one of 7 operational-phase initial defense satcoms
IDCSP 2	1966 53C	USAF	Jun 16	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense satcom, all successfully separated
IDCSP 3	1966 53D	USAF	Jun 16	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense communications
IDCSP 4	1966 53E	USAF	Jun 16	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense communications
IDCSP 5	1966 53F	USAF	Jun 16	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense communications
IDCSP 6	1966 53G	USAF	Jun 16	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense communications
IDCSP 7	1966 53H	USAF	Jun 16	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense communications

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 121	1966 54A	USSR	Jun 17	Plesetsk	SL-3	4,730	89.9	200	333	72.9	Reentered 6/25/66
None	1966 55A	USAF	Jun 21	WTR	TAT-Agena D	1,500	90.2	194	367	80.1	Decayed 7/14/66
Pageos	1966 56A	NASA	Jun 24	WTR	TAT-Agena D	55	180.5	4,038	4,201	85	In orbit: 100-ft balloon, photographed in geodetic study. Gradually broke up 1975-78
Kosmos 122	1966 57A	USSR	Jun 25	Tyuratam	SL-3	4,730	94.3	469	495	65	Metsat, launch witnessed by Gen. de Gaulle. Decayed 11/14/89
Explorer 33	1966 58A	NASA	Jul 1	ETR	TAD	93.3	23,148	30,532	494,236	29.0*	In orbit: excessive velocity prevented lunar orbit; active (IMP D)
Apollo 2 (AS-203)	1966 59A	NASA	Jul 5	ETR	Saturn IB	26,500	88.5	183	212	32.0	Decayed 7/5/66: S-IVB blown up, not considered a spacecraft
Proton 3	1966 60A	USSR	Jul 6	Tyuratam	SL-9	12,200	92.5	185	585	63.5	Decayed 9/16/66: heavy weight research
Kosmos 123	1966 61A	USSR	Jul 8	Kapustin Yar	SL-7	325	92.2	256	512	48.8	Decayed 12/10/66
None	1966 62A	USAF	Jul 12	WTR	Atlas-Agena D	2,000	88.7	137	236	95.5	Decayed 7/20/66
OV1 7	None	USAF	Jul 14	WTR	Atlas D	118	—	—	—	—	Failed to orbit: injection motor failed; 30-ft wire mesh sphere for passive commsat tests
OV1 8	1966 63A	USAF	Jul 14	WTR	Atlas D	10	105.2	998	1,013	144.2	Decayed 1/4/78
Kosmos 124	1966 64A	USSR	Jul 14	Tyuratam	SL-3	4,730	89.4	205	286	51.8	Reentered 7/22/66
Gemini 10/ Target	1966 65A	NASA	Jul 18	ETR	Atlas-Agena D	3,175	90.4	290	296	28.9	Decayed 12/29/66: raised Gemini 10's apogee to 755 km
Gemini 10	1966 66A	NASA	Jul 18	ETR	Titan II	3,757	88.8	160	268	28.9	Docked w/ Gemini 10 target 7/19. EVA to Gemini 8 target 7/20. John Young, Michael Collins landed after 46 orbits, 70.8 hrs
Kosmos 125	1966 67A	USSR	Jul 20	Tyuratam	SL-10	4,000	89.5	205	258	65	Reentered 8/2/66
Kosmos 126	1966 68A	USSR	Jul 28	Tyuratam	SL-3	4,730	90	204	350	51.8	Reentered 8/6/66
None	1966 69A	USAF	Jul 29	WTR	Titan IIIB-Agena D	3,000	88.5	158	250	94.1	Decayed 8/6/66: 1st Titan IIIB launch
OV3 3	1966 70A	USAF	Aug 4	WTR	Scout	75	128.7	353	3,600	81.4	In orbit: radiation research; deactivated
Kosmos 127	1966 71A	USSR	Aug 8	Tyuratam	SL-3	4,730	89.2	201	267	51.9	Reentered 8/16/66

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1966 72A	USAF	Aug 9	WTR	Thorad-Agena D	1,500	89.4	194	287	100.1	Decayed 9/11/66: 1st Thorad launch
Lunar Orbiter 1	1966 73A	NASA	Aug 10	ETR	Atlas-Agena D	386					Returned lunar photos until 8/29. Crashed on moon 10/29/66
None	1966 74A	USAF	Aug 16	WTR	Atlas-Agena D	2,000	89.4	146	358	93.3	Decayed 8/24/66
None	1966 74B	USAF	Aug 16	WTR	Atlas-Agena D	60	94.9	510	524	93.2	Decayed 3/5/70
Pioneer 7	1966 75A	NASA	Aug 17	ETR	TAD	63	402.9 days	1.010 AU	1.125 AU	0.097	In solar orbit: 6 solar and interplanetary experiments, active
None	1966 76A	USN	Aug 17	WTR	Scout	58	106.6	1,040	1,093	88.9	In orbit
None	1966 77A	USAF/ USA	Aug 19	WTR	Atlas-Agena D	2,000	167.4	3,659	3,707	89.9	In orbit
EGRS 7	1966 77B	USAF/ USA	Aug 19	WTR	Atlas-Agena D	17	167.5	3,673	3,697	89.8	In orbit: 1st of new geodetic series; deactivated
ERS 15	1966 77C	USAF/ USA	Aug 19	WTR	Atlas-Agena D	5	167.6	3,681	3,699	89.8	In orbit: 5 cold-welding experiments
Luna 11	1966 78A	USSR	Aug 24	Tyuratam	SL-6	1,638	Selenocentric Orbit				Returned scientific data until 10/1/66
IDCSP	None	USAF	Aug 26	ETR	Titan IIIC	362	—	—	—	—	Failed to orbit: Titan IIIC malfunctioned, carried 8 IDCSP's
Kosmos 128	1966 79A	USSR	Aug 27	Tyuratam	SL-3	4,730	90	213	319	65	Reentered 9/4/66
Gemini 11/ Target	1966 80A	NASA	Sep 12	ETR	Atlas-Agena D	3,175	90.4	298	298	28.8	Decayed 12/30/66: raised Gemini 11's apogee to 1,368 km
Gemini 11	1966 81A	NASA	Sep 12	ETR	Titan II	3,793	89.0	161	280	28.8	Docked w/ target 9/12. EVA. Reentered 9/15/66. Charles Conrad, Richard Gordon landed after 47 orbits, 71.3 hrs
None	1966 82A	USAF	Sep 16	WTR	Thor-Burner II	125	100.4	680	872	98.8	In orbit: initial use of Burner II
None	1966 83A	USAF	Sep 16	WTR	Atlas-Agena D	2,000	89.1	148	333	93.9	Decayed 9/23/66
None	1966 83B	USAF	Sep 16	WTR	Atlas-Agena D	160	94.2	460	501	94.0	Decayed 5/9/68
Kosmos		USSR	Sep 16	Tyuratam	SL-3	4,730					Failed to orbit
Surveyor 2	1966 84A	NASA	Sep 20	ETR	Atlas-Centaur	292	Flight time: 62.8 hours				Crashed on Moon 9/23/66. Vernier failed
None	1966 85A	USAF	Sep 20	WTR	TAT-Agena D	1,500	90.6	188	442	85.1	Decayed 10/12/66

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Luna	None	USSR	Sep 25	Tyuratam	SL-6						Lunar probe; failed to orbit
Lambda 4S 1	None	Japan	Sep 26	Kagoshima	Lambda 4S	26	—	—	—	—	Failed to orbit: 1st attempt to launch a Japanese test satellite
None	1966 86A	USAF	Sep 28	WTR	Titan IIIB-Agena D	3,000	88.8	151	296	94.0	Decayed 10/7/66
ESSA 3	1966 87A	ESSA	Oct 2	WTR	TAD	145	114.5	1,384	1,484	100.9	In orbit: replaced ESSA 1 in TOS system, silenced 10/9/68
None	1966 88A	USSR	Sep 17	Tyuratam	SL-11	4,250	94.6	163	1,046	49.6	Decayed 11/11/66: Unannounced launch, payload exploded, 53 pieces
None	1966 89A	USAF	Oct 5	WTR	Atlas-Agena D	2,000	167.5	3,661	3,715	90.3	In orbit
EGRS 8	1966 89B	USAF	Oct 5	WTR	Atlas-Agena D	17	167.6	3,679	3,702	90.3	In orbit: geodetic; deactivated
None	1966 90A	USAF	Oct 12	WTR	Atlas-Agena D	2,000	88.6	155	287	91.0	Decayed 10/20/66
None	1966 90B	USAF	Oct 12	WTR	Atlas-Agena D	—	88.9	181	258	90.9	Decayed 10/21/66
Kosmos 129	1966 91A	USSR	Oct 14	Plesetsk	SL-3	4,730	89.4	180	312	65	Reentered 10/21/66
Molniya 1D	1966 92A	USSR	Oct 20	Tyuratam	SL-6	1,750	713	505	39,685	64.9	Decayed 9/11/68: 4th Russian commsat
Kosmos 130	1966 93A	USSR	Oct 20	Tyuratam	SL-3	4,730	89.8	208	314	65	Reentered 10/28/66
Luna 12	1966 94A	USSR	Oct 22	Tyuratam	SL-6	1,620	Selenocentric Orbit				Photographed Moon, returned scientific data
Atlas-Centaur 9	1966 95A	NASA	Oct 26	ETR	Atlas-Centaur	951	1593.3	166	406,200	29.6	Decayed 11/6/66: Centaur test, not considered a spacecraft
Intelsat 2A	1966 96A	CSC	Oct 26	ETR	TAD	140	718.4	3,161	37,244	17.9	Failed to achieve geosynchronous orbit due to apogee motor malfunction. Active but unusable in normal service
OV3 2	1966 97A	USAF	Oct 28	WTR	Scout	82	104.2	320	1,597	82.0	Decayed 9/29/71: radiation
None	1966 98A	USAF	Nov 2	WTR	Atlas-Agena D	2,000	88.9	159	305	91.0	Decayed 11/10/66
None	1966 98B	USAF	Nov 2	WTR	Atlas-Agena D	—	89.6	208	324	91.0	Decayed 11/16/66
OV4 3	1966 99A	USAF	Nov 3	ETR	Titan IIIC	9,680	90.6	298	305	32.8	Decayed 1/9/67: modified Titan II tank carrying 9 experiments
OV4 1R	1966 99B	USAF	Nov 3	ETR	Titan IIIC	136	90.4	291	298	32.8	Decayed 1/5/67: receiver for "whispering gallery" experiments

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
OV1 6	1966 99C	USAF	Nov 3	ETR	Titan IIIC	202	90.4	290	295	32.8	Decayed 12/31/66
OV4 1T	1966 99D	USAF	Nov 3	ETR	Titan IIIC	109	90.7	294	321	32.8	Decayed 1/11/67: transmitter for ``whispering gallery'' test
Luna Orbiter 2	1966 100A	NASA	Nov 6	ETR	Atlas-Agena D	390					Hit moon 10/11/67: returned 205 lunar frames
None	1966 101A*	USSR	Nov 2	Tyuratam	SL-11	4,400	94.6	140	855	49.6	Decayed 11/29/66: Unannounced launch, payload exploded, 41 pieces
None	1966 102A	USAF	Nov 8	WTR	TAT-Agena D	1,500	89.4	172	318	100.1	Decayed 11/29/66
Gemini 12/ Target	1966 103A	NASA	Nov 11	ETR	Atlas-Agena D	3,175	90.4	243	310	28.9	Decayed 12/23/66: positioned Gemini 12 for solar eclipse photo
Gemini 12	1966 104A	NASA	Nov 11	ETR	Titan II	3,655	89.0	243	310	28.9	Docked w/ target 11/12. Reentered 11/15/66 after 63 orbits, 94.6 hrs. James Lovell, Edwin Aldrin conducted successful EVA tests
Kosmos 131	1966 105A	USSR	Nov 12	Plesetsk	SL-3	4,730	89.9	206	326	72.9	Reentered 11/20/66
Kosmos	None	USSR	Nov 16	Tyuratam	SL-8						Failed to orbit
Kosmos 132	1966 106A	USSR	Nov 19	Tyuratam	SL-3	4,730	89.3	210	276	65	Reentered 11/27/66
Kosmos 133	1966 107A	USSR	Nov 28	Tyuratam	SL-4	6,450	88.4	171	223	51.9	Reentered 11/30/66: believed to be Soyuz precursor
Kosmos 134	1966 108A	USSR	Dec 3	Tyuratam	SL-3	4,730	89.6	201	294	65	Reentered 12/11/66
None	1966 109A	USAF	Dec 5	WTR	Atlas-Agena D	2,000	89.7	137	388	104.6	Decayed 12/14/66
ATS 1	1966 110A	NASA	Dec 7	ETR	Atlas-Agena D	352	1,435.0	35,734	35,797	10.5	In orbit: Applications Technology Satellite. communication and meteorological tests
OV1 9	1966 111A	USAF	Dec 11	WTR	Atlas D	230	141.0	472	4,694	99.1	In orbit: radiation; studied bio-hazards; deactivated
OV1 10	1966 111B	USAF	Dec 11	WTR	Atlas D	130	97.8	594	686	93.4	In orbit: gravity-stabilized, radiation; deactivated
Kosmos 135	1966 112A	USSR	Dec 12	Kapustin Yar	SL-7	355	93.5	253	649	48.5	Decayed 4/12/67
None	1966 113A	USAF	Dec 14	WTR	Titan IIIB-Agena D	3,000	89.5	138	368	109.5	Decayed 12/24/66
Biosatellite 1	1966 114A	NASA	Dec 14	ETR	TAD	425	90.7	295	309	33.5	Decayed 2/15/67: failed to return biological capsule
Kosmos 136	1966 115A	USSR	Dec 19	Plesetsk	SL-3	4,730	89.4	188	280	64.6	Reentered 12/27/66

*Int'l designation number assigned later

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Lambda 4S 2	None	Japan	Dec 20	Kagoshima	Lambda 4S	58	—	—	—	—	Failed to orbit: 2nd attempt test satellite; 4th stage ignition did not ignite
Luna 13	1966 116A	USSR	Dec 21	Tyuratam	SL-6	1,700	Flight time: 79.7 hours				Landed on moon 12/24/66: returned photos, soil density data
Kosmos 137	1966 117A	USSR	Dec 21	Kapustin Yar	SL-7	295	104.3	219	1,718	48.8	Decayed 11/23/67
None	1966 118A	USAF	Dec 29	WTR	TAT-Agena D	1,500	94.4	486	497	74.0	Decayed 4/5/69
Intelsat 2B (Pacific 1)	1967 1A	CSC	Jan 11	ETR	TAD	87	1,330	33,600	33,900	0.1*	In orbit: trans-Pacific comm service began 1/27/67
None	1967 2A	USAF	Jan 14	WTR	TAT-Agena D	1,500	90.0	180	380	80.1	Decayed 2/2/67
IDCSP 8 - 15	1967 3A -1967 3H	USAF	Jan 18	ETR	Titan IIIC	45 ea	Current elements not maintained				In orbit: 2nd successful multiple launch of initial defense communications satellites
Kosmos 138	1967 4A	USSR	Jan 19	Plesetsk	SL-3	4,730	89.2	191	273	65	Reentered 1/27/67
Kosmos 139	1967 5A	USSR	Jan 25	Tyuratam	SL-11	5,000	87.5	144	210	50	Reentered 1/25/67: FOBS flight test
ESSA 4	1967 6A	ESSA	Jan 26	WTR	TAD	132	113.4	1,324	1,437	102.0	In orbit: replaced ESSA 2, camera failure caused deactivation 12/6/67
OV3 5	None	USAF	Jan 31	WTR	Scout	94	—	—	—	—	Failed to orbit: atmospheric research
None	1967 7A	USAF	Feb 2	WTR	Atlas-Agena D	2,000	88.8	136	357	102.4	Decayed 2/12/67
Lunar Orbiter 3	1967 8A	NASA	Feb 5	ETR	Atlas-Agena D	385					Hit moon 10/9/67. Returned 182 lunar frames
Kosmos 140	1967 9A	USSR	Feb 7	Tyuratam	SL-4	6,450	88.5	165	218	51.7	Reentered 2/9/67: believed to be Soyuz precursor
None	1967 10A	USAF	Feb 8	WTR	Thor-Burner II	250	101.3	778	854	98.9	In orbit
Diademe 1	1967 11A	France	Feb 8	Hammaguir	Diamant	23	102.9	557	1,198	40.0	In orbit: geodetic; operational in spite of low apogee
Kosmos 141	1967 12A	USSR	Feb 8	Plesetsk	SL-3	4,730	89.8	205	316	72.9	Reentered 2/16/67
Kosmos 142	1967 13A	USSR	Feb 14	Kapustin Yar	SL-7	315	100.3	207	1,336	48.4	Decayed 7/6/67
Diademe 2	1967 14A	France	Feb 15	Hammaguir	Diamant	23	109.4	589	1,790	39.4	In orbit: provided good laser, doppler data until 4/5/67
None	1967 15A	USAF	Feb 22	WTR	TAT-Agena D	1,500	90.1	180	380	80.0	Decayed 3/11/67
None	1967 16A	USAF	Feb 24	WTR	Titan IIIB-Agena D	3,000	89.8	135	414	107.0	Decayed 3/6/67

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 143	1967 17A	USSR	Feb 27	Tyuratam	SL-3	1,730	89.5	204	297	65	Reentered 3/7/67
Kosmos 144	1967 18A	USSR	Feb 28	Plesetsk	SL-3	4,730	93.2	574	644	81.2	Decayed 9/14/82. meteorological; similar to Kosmos 122
Kosmos 145	1967 19A	USSR	Mar 3	Kapustin Yar	SL-7	250	108.6	215	2,116	48.4	Decayed 3/8/68
OSO 3	1967 20A	NASA	Mar 8	ETR	Delta	281	91.4	534	564	32.9	Decayed 4/4/82: Orbiting Solar Observatory, 9 experiments
Kosmos 146	1967 21A	USSR	Mar 10	Tyuratam	SL-12	5,375	89.2	177	296	51.5	Reentered 3/18/67: believed to be manned precursor
Kosmos 147	1967 22A	USSR	Mar 13	Plesetsk	SL-3	4,730	89.5	195	301	65	Reentered 3/21/67
Kosmos 148	1967 23A	USSR	Mar 16	Plesetsk	SL-7	325	91.3	270	404	71	Decayed 5/7/67
Kosmos 149	1967 24A	USSR	Mar 21	Kapustin Yar	SL-7	375	89.8	245	285	48.4	Decayed 4/7/67: earth- oriented metsat
Kosmos 150	1967 25A	USSR	Mar 22	Plesetsk	SL-3	4,730	90.1	204	350	65.7	Reentered 3/30/67
Intelsat 2C (Atlantic 2)	1967 26A	CSC	Mar 23	ETR	TAD	192	1,434	35,687	35,771	1.4*	In orbit over Atlantic. 3rd Intelsat 2; comm service began 4/7/67
Kosmos 151	1967 27A	USSR	Mar 24	Tyuratam	SL-8	875	95.7	508	540	56.1	Decayed 5/16/91
Kosmos 152	1967 28A	USSR	Mar 25	Plesetsk	SL-7	325	92.2	272	488	71	Decayed 8/5/67
None	1967 29A	USAF	Mar 30	WTR	TAT-Agena D	1,500	90.1	167	326	85.0	Decayed 4/17/67
Kosmos 153	1967 30A	USSR	Apr 4	Plesetsk	SL-3	4,730	89.3	199	279	64.6	Reentered 4/12/67
ATS 2	1967 31A	NASA	Apr 6	ETR	Atlas-Agena D	370	218.9	178	11,124	28.4	Decayed 9/2/69 elliptical orbit prevented gravity gradient test
Kosmos 154	1967 32A	USSR	Apr 8	Tyuratam	SL-13	5,375	88.5	183	223	51.6	Reentered 4/10/67: believed to be manned precursor
Kosmos 155	1967 33A	USSR	Apr 12	Tyuratam	SL-3	4,730	89.2	193	272	51.8	Reentered 4/20/67
None	1967 34A	USN	Apr 13	WTR	Scout	60	106.3	1,038	1,070	90.3	In orbit
Lambda 4S 3	None	Japan	Apr 13	Kagoshima	Lambda 4S	26	—	—	—	—	Failed to orbit: Japan's 3rd attempt to orbit test satellite (4th stage)
Surveyor 3	1967 35A	NASA	Apr 17	ETR	Atlas-Centaur	283	Flight time: 65.0 hours				Landed on Moon 4/20/67: soil sampler, photo experiments until 5/3/67
ESSA 5	1967 36A	ESSA	Apr 20	WTR	TAD	145	113.5	1,352	1,419	102.0	In orbit: replaced ESSA 3

*Initial elements

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Soyuz 1	1967 37A	USSR	Apr 23	Tyuratam	SL-4	6,450	88.6	198	211	51.7	Reentered 4/24/67: recovery attempt after 18 orbits, 26.8 hr; failed due to fouled parachutes; Vladimir Komarov killed
San Marco 2	1967 38A	Italy	Apr 26	IO*	Scout	129	94.9	135	498	2.9	Decayed 10/14/67: 1st equatorial launch, returned air density data
None	None	USAF	Apr 26	WTR	Titan IIIB-Agena D	3,000	—	—	—	—	Failed to orbit
Kosmos 156	1967 39A	USSR	Apr 27	Plesetsk	SL-3	4,730	95.i	467	483	81.2	Metsat, formed operational system with Kosmos 144. Decayed 10/23/89
Vela 7	1967 40A	USAF	Apr 28	ETR	Titan IIIC	317	Current elements not maintained				In orbit: earth-oriented advanced nuclear test detection
Vela 8	1967 40B	USAF	Apr 28	ETR	Titan IIIC	317	Current elements not maintained				In orbit: lags Vela 7 by 180 degrees
ERS 18	1967 40C	USAF	Apr 28	ETR	Titan IIIC	9	Current elements not maintained				In orbit: radiation research subsatellite
OV5 3	1967 40D	USAF	Apr 28	ETR	Titan IIIC	9	Current elements not maintained				In orbit: radiation research subsatellite (ERS 20); deactivated
OV5 1	1967 40E	USAF	Apr 28	ETR	Titan IIIC	9	Current elements not maintained				In orbit: materials research subsatellite (ERS 27); deactivated
Lunar Orbiter 4	1967 41A	NASA	May 4	ETR	Atlas-Agena D	390					Crashed on Moon 10/6/67: returned 163 frames
Ariel 3	1967 42A	UK	May 5	WTR	Scout	90	95.6	497	608	80.2	Decayed 12/14/70: 1st all-British research
None	1967 43A	USAF	May 9	WTR	LTTAT-** Agena D	2,000	94.3	200	777	85.1	Decayed 7/13/67
None	1967 43B	USAF	May 9	WTR	LTTAT-Agena D	60	96.8	505	660	84.9	In orbit
Kosmos 157	1967 44A	USSR	May 12	Tyuratam	SL-3	4,730	89.4	249	262	51.3	Reentered 5/20/67
Kosmos 158	1967 45A	USSR	May 15	Plesetsk	SL-8	750	100.3	731	816	74.0	In orbit
Kosmos 159	1967 46A	USSR	May 17	Tyuratam	SL-6	4,490	1174	350	60,637	51.8	Decayed 11/11/77
Kosmos 160	1967 47A	USSR	May 17	Tyuratam	SL-11	5,000	88.4	137	177	49.6	Reentered 5/18/67: FOBS flight test
None	1967 48A	USN	May 18	WTR	Scout	60	106.8	1,062	1,095	89.7	In orbit
Kosmos 161	1967 49A	USSR	May 22	Plesetsk	SL-3	4,730	89.8	201	321	65.7	Reentered 5/30/67:

*Indian Ocean

**Long Tank Thrust Augmented Thor

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1967 50A	USAF	May 22	WTR	Atlas-Agena D	2,000	89.1	135	293	91.5	Decayed 5/30/67
None	1967 50B	USAF	May 22	WTR	Atlas-Agena D	700	88.3	148	240	91.4	Decayed 5/27/67
Explorer 34	1967 51A	NASA	May 24	WTR	TAD	75	6,346	242	214,383	67.1	Decayed 5/3/69: returned radiation, magnetic fields data (IMP-F)
Molniya 1E	1967 52A	USSR	May 24	Tyuratam	SL-6	1,750	715	460	39,785	64.8	Decayed 11/26/71: 5th Soviet commsat, in 12-hour orbit
ESRO 2A	None	ESRO*	May 29	WTR	Scout	74	—	—	—	—	Failed to orbit: 3rd stage failure foiled 1st European Space Research Organization launch
None	1967 53A	USAF/ USN	May 31	WTR	Thor-Agena D	700	102.6	865	875	70.0	In orbit
Surcal	1967 53B	USAF/ USN	May 31	WTR	Thor-Agena D	2.4	103.3	906	918	70.0	In orbit: 20-inch surveillance calibration sphere
GGSE 4	1967 53C	USAF/ USN	May 31	WTR	Thor-Agena D	4	103.3	907	918	70.0	In orbit: gravity gradient stabilization experiment
GGSE 5	1967 53D	USAF/ USN	May 31	WTR	Thor-Agena D	4	103.3	908	919	70.0	In orbit: gravity gradient stabilization experiment
Timation 1	1967 53E	USAF/ USN	May 31	WTR	Thor-Agena D	4	103.2	902	913	70.0	In orbit
Surcal	1967 53F	USAF/ USN	May 31	WTR	Thor-Agena D	38	103.2	906	915	70.0	In orbit: navigation experiment
None	1967 53G	USAF/ USN	May 31	WTR	Thor-Agena D	—	103.3	906	918	70.0	In orbit
None	1967 53H	USAF/ USN	May 31	WTR	Thor-Agena D	—	103.3	908	919	70.0	In orbit
Surcal	1967 53J	USAF/ USN	May 31	WTR	Thor-Agena D	1.5	102.4	859	863	70.0	In orbit: 16-inch surveillance calibration sphere
Kosmos 162	1967 54A	USSR	Jun 1	Tyuratam	SL-3	4,730	89.2	196	275	51.8	Reentered 6/9/67
None	1967 55A	USAF	Jun 4	WTR	Atlas-Agena D	2,000	89.3	149	456	104.8	Decayed 6/12/67
Kosmos 163	1967 56A	USSR	Jun 5	Kapustin Yar	SL-7	357	93.1	244	611	48.4	Decayed 10/11/67

*European Space Research Organization

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 164	1967 57A	USSR	Jun 8	Plesetsk	SL-3	4,730	89.5	185	317	65.7	Reentered 6/14/67
Venera 4	1967 58A	USSR	Jun 12	Tyuratam	SL-6	1,104	Flight time: 128.4 days				Presumed impact on Venus 10/18/67: tx during 94-min descent
Kosmos 165	1967 59A	USSR	Jun 12	Plesetsk	SL-7	250	102.1	198	1.515	81.9	Decayed 1/15/68
Mariner 5	1967 60A	NASA	Jun 14	ETR	Atlas-Agena D	244	194.6 days	0.579 AU	0.735 AU	1.37	In solar orbit: 2,480-mi Venus flyby 10/19/67
Kosmos 166	1967 61A	USSR	Jun 16	Kapustin Yar	SL-7	357	92.9	281	553	48.4	Decayed 10/25/67: performed solar radiation experiments
None	1967 62A	USAF	Jun 16	WTR	LTTAT-Agena D	2,000	89.9	181	367	80.1	Decayed 7/20/67
None	1967 62B	USAF	Jun 16	WTR	LTTAT-Agena D	60	94.8	501	517	80.2	Decayed 10/22/68
Kosmos 167	1967 63A	USSR	Jun 17	Tyuratam	SL-6	1,106	89.2	187	266	51.8	Decayed 6/25/67
None	1967 64A	USAF	Jun 20	WTR	Titan IIIB-Agena D	3,000	89.8	127	325	111.5	Decayed 6/30/67
None	None	USSR	Jun 20	Tyuratam	SL-3	4,730					Failed to orbit
EGRS 9	1967 65A	USA/USN	Jun 29	WTR	Thor-Burner II	20	172.1	3,792	3,946	89.8	In orbit: geodetic; location survey; deactivated
Aurora 1	1967 65B	USA/USN	Jun 29	WTR	Thor-Burner II	21	172.1	3,793	3,946	89.8	In orbit: investigated formation of Aurora Borealis
IDCSP	1967 66A	USAF	Jul 1	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense communications
IDCSP	1967 66B	USAF	Jul 1	ETR	Titan IIIC	45	Current elements not maintained				In orbit: initial defense communications
IDCSP	1967 66C	USAF	Jul 1	ETR	Titan IIIC	45	Current elements not maintained				In orbit: completed initial defense satcom global system
DATS 1	1967 66D	USAF	Jul 1	ETR	Titan IIIC	68	Current elements not maintained				In orbit: electronically despun antenna test
LES 5	1967 66E	USN	Jul 1	ETR	Titan IIIC	194	Current elements not maintained				In orbit: 5th experimental military tactical commsat
DODGE	1967 66F	USAF	Jul 1	ETR	Titan IIIC	102	1,318.9	33,270	33,659	5.2	In orbit: DOD gravity gradient experiment
Kosmos 168	1967 67A	USSR	Jul 4	Tyuratam	SL-3	4,730	89.1	198	264	51.8	Reentered 7/12/67
Surveyor 4	1967 68A	NASA	Jul 14	ETR	Atlas-Centaur	283	Flight time: 63.0 hours				Crashed on moon 7/17/67: signal lost 2.5 min before landing
Kosmos 169	1967 69A	USSR	Jul 17	Tyuratam	SL-11	5,000	87.6	135	200	50	Reentered 7/17/67: FOBS flight test

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Date			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Explorer 35	1967 70A	NASA	Jul 19	ETR	TAD	104	Selenocentric Orbit				Measures earth's magnetic tail every 29.5 days (IMP-E)
None		USSR	Jul 21	Tyuratam	SL-3						Failed to orbit
None	1967 71A	USAF	Jul 25	WTR	TAT-Agena D	1,500	94.3	458	513	75.0	Decayed 6/5/69
OV1 11	None	USAF	Jul 27	WTR	Atlas D	134	—	—	—	—	Failed to orbit: propulsion system malfunctioned
OV1 86	1967 72A	USAF	Jul 27	WTR	Atlas D	118	95.5	480	604	101.6	Decayed 2/22/72: 4 experiments including cosmic ray telescope
OV1 12	1967 72D	USAF	Jul 27	WTR	Atlas D	140	95.4	542	556	101.7	Decayed 7/22/80: flare activated radiological observatory
OGO 4	1967 73A	NASA	Jul 28	WTR	TAT-Agena D	634	98.1	411	903	86.0	Orbiting Geophysical Observatory. Decayed 8/16/72. Tape recorder failed 1/19/69; spacecraft exceeded lifetime
Kosmos 170	1967 74A	USSR	Jul 31	Tyuratam	SL-11	5,000	88.1	121	252	49.4	Reentered 7/31/67 w/in minutes. FOBS flight test
Lunar Orbiter 5	1967 75A	NASA	Aug 1	ETR	Atlas-Agena D	389					Crashed on Moon 1/31/68: end of Lunar Orbiter photographic mapping program
None	1967 76A	USAF	Aug 7	WTR	LTTAT-Agena D	2,000	89.9	174	346	80.0	Decayed 9/1/67
Kosmos 171	1967 77A	USSR	Aug 8	Tyuratam	SL-11	5,000	87.5	138	177	49.6	Reentered 8/8/67 w/in minutes. FOBS flight test
Kosmos 172	1967 78A	USSR	Aug 9	Tyuratam	SL-3	4,730	89.4	200	293	51.8	Reentered 8/17/67
None	1967 79A	USAF	Aug 16	WTR	Titan IIIB-Agena D	3,000	89.4	142	449	111.6	Decayed 8/29/67
None	1967 80A	USAF	Aug 23	WTR	Thor-Burner II	195	102.2	822	878	98.8	In orbit
Kosmos 173	1967 81A	USSR	Aug 24	Plesetsk	SL-7	325	92.3	277	480	71	Decayed 12/17/67
Kosmos 174	1967 82A	USSR	Aug 31	Tyuratam	SL-6	1,750	715	430	39,845	64.5	Decayed 12/30/68: believed to be commsat failure
None	None	USSR	Sep 1	Tyuratam	SL-3						Failed to orbit
Biosatellite 2	1967 83A	NASA	Sep 7	ETR	TAD	507	90.8	286	313	33.5	Reentered 10/4/67, biological capsule recovered after 44.9 hours
Surveyor 5	1967 84A	NASA	Sep 8	ETR	Atlas-Centaur	279	Flight time: 64.8 hours				Landed on moon 9/11/67: returned 19,000 photos, soil analysis data
Kosmos 175	1967 85A	USSR	Sep 11	Plesetsk	SL-3	4,730	92.2	211	358	72.9	Reentered 9/19/67
Kosmos 176	1967 86A	USSR	Sep 12	Plesetsk	SL-7	250	102.5	196	1,525	81.9	Decayed 3/3/68

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1967 87A	USAF	Sep 15	WTR	LTTAT-Agena D	2,000	89.8	150	389	80.1	Decayed 10/4/67
Kosmos 177	1967 88A	USSR	Sep 16	Tyuratam	SL-3	4,730	89.3	200	280	51.8	Reentered 9/24/67
Kosmos 178	1967 89A	USSR	Sep 19	Tyuratam	SL-11	5,000	88.3	138	258	49.6	Reentered 9/19/67. FOBS flight test
None	1967 90A	USAF	Sep 19	WTR	Titan IIIB-Agena D	3,000	89.9	122	401	106.1	Decayed 9/30/67
Kosmos 179	1967 91A	USSR	Sep 22	Tyuratam	SL-11	5,000	87.8	139	207	49.6	Reentered 9/22/67: FOBS flight test
None	1967 92A	USAF/ USN	Sep 25	WTR	Scout	60	106.6	1,030	1,105	89.3	In orbit
Kosmos 180	1967 93A	USSR	Sep 26	Plesetsk	SL-3	4,730	90.1	208	341	72.9	Reentered 10/4/67
Intelsat 2D (Pacific 2)	1967 94A	CSC	Sep 28	ETR	TAD	87	1,438.3	35,747	35,913	0.9*	In orbit: 4th Intelsat 2; trans-Pacific service begun 11/4/67
Zond	None	USSR	Sep 28	Tyuratam	SL-12						First stage failure
Molniya 1F	1967 95A	USSR	Oct 3	Tyuratam	SL-6	1,750	712	502	39,868	65	Decayed 3/4/69; 6th Soviet commsat
None	1967 96A	USAF	Oct 11	WTR	Thor-Burner II	195	99.5	650	822	99.2	In orbit
Kosmos 181	1967 97A	USSR	Oct 11	Plesetsk	SL-3	4,730	89.7	188	280	65.6	Reentered 10/18/67
Kosmos 182	1967 98A	USSR	Oct 16	Tyuratam	SL-3	4,730	89.9	210	330	65	Reentered 10/24/67
Kosmos 183	1967 99A	USSR	Oct 18	Tyuratam	SL-11	5,000	87.4	130	315	50	Reentered 10/18/67: FOBS flight test
OSO 4	1967 100A	NASA	Oct 18	ETR	Delta	272	92.1	546	560	33.0	Decayed 6/15/82: returned 1st pictures of sun in extreme ultraviolet
Molniya 1G	1967 101A	USSR	Oct 22	Tyuratam	SL-6	1,750	714	508	39,710	64.7	Decayed 12/31/69: 7th Soviet commsat
Kosmos 184	1967 102A	USSR	Oct 24	Plesetsk	SL-3	4,730	93.6	441	459	81.2	4th Soviet weather satellite. Decayed 4/2/89
None	1967 103A	USAF	Oct 25	WTR	Titan IIIB-Agena D	3,000	89.5	136	429	111.4	Decayed 11/5/67
Kosmos 185	1967 104A	USSR	Oct 27	Tyuratam	SL-11	4,000	98.7	518	873	64.1	Decayed 1/14/69: probable metsat
Kosmos 186	1967 105A	USSR	Oct 27	Tyuratam	SL-4	6,530	88.7	172	212	51.7	Reentered 10/31/67. Docked with Kosmos 188 10/30; 1st automatic docking
Kosmos 187	1967 106A	USSR	Oct 28	Tyuratam	SL-11	5,000	87.4	143	301	50	Reentered 10/28/67: FOBS flight test

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 188	1967 107A	USSR	Oct 30	Tyuratam	SL-4	6,530	89.0	180	247	51.7	Reentered 11/2/67: target vehicle for Kosmos 188 auto docking
Kosmos 189	1967 108A	USSR	Oct 30	Plesetsk	SL-8	875	95.7	524	565	74	Decayed 6/8/78
None	1967 109A	USAF	Nov 2	WTR	LTTAT-Agena D	2,000	90.7	183	410	81.5	Decayed 12/2/67
None	1967 109B	USAF	Nov 2	WTR	LTTAT-Agena D	60	94.3	455	524	81.6	Decayed 3/28/69
Kosmos 190	1967 110A	USSR	Nov 3	Plesetsk	SL-3	4,730	89.8	191	338	65.7	Reentered 11/11/67
ATS 3	1967 111A	NASA	Nov 5	ETR	Atlas-Agena D	365	1,436.1	35,730	35,844	9.2	In orbit: tx color, b&w photos of entire earth
Surveyor 6	1967 112A	NASA	Nov 7	ETR	Atlas-Centaur	280	Flight time: 65.4 hours				Landed on moon 11/10/67: performed 1st rocket takeoff from moon
Apollo 4	1967 113A	NASA	Nov 9	ETR	Saturn V	36,656	88.3	183	188	32.6	Reentered 11/9/67: successful 1st flight of Apollo/Saturn V
ESSA 6	1967 114A	ESSA	Nov 10	WTR	TAD	132	114.8	1,407	1,483	102.1	In orbit: returned photos of cloud cover every 6 min: deactivated 11/4/69 due to degraded vidicon and excessive drift out of sun synch
Kosmos 191	1967 115A	USSR	Nov 21	Plesetsk	SL-7	325	92.2	267	497	71	Decayed 3/2/68
Zond	None	USSR	Nov 22	Tyuratam	SL-12						Failed to orbit. Lunar flyby attempt. 2nd stage failure
Kosmos 192	1967 116A	USSR	Nov 23	Plesetsk	SL-8	775	99.5	727	736	74	In orbit
Kosmos 193	1967 117A	USSR	Nov 25	Plesetsk	SL-3	4,730	89.9	202	335	65.7	Reentered 12/3/67
WRESAT 1	1967 118A	Aust	Nov 29	Woomera	SPARTA*	45	95.7	193	1.259	83.2	Decayed 1/10/68: Weapons Research Establishment Satellite returned solar radiation and upper atmospheric data
Kosmos 194	1967 119A	USSR	Dec 3	Plesetsk	SL-3	4,730	89.7	201	307	65.7	Reentered 12/11/67
OV3 6	1967 120A	USAF	Dec 5	WTR	Scout	95	92.9	412	439	90.6	Decayed 3/9/69: conducted ionospheric studies; tx ended 5th day
None	1967 121A	USAF	Dec 5	WTR	Titan IIIB-Agena D	3,000	90.2	137	430	109.5	Decayed 12/16/67
None	1967 122A	USAF	Dec 9	WTR	LTTAT-Agena D	2,000	88.4	158	237	81.6	Decayed 12/25/67

*Special Antimissile Research Test; Modified Redstone booster plus solid upper stage rockets

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Pioneer 8	1967 123A	NASA	Dec 13	ETR	TAD	63	—	1.0 AU	1.1 AU	—	In solar orbit: 8 experiments studying solar radiation; active
TETR 1	1967 123B	NASA	Dec 13	ETR	TAD	20	92.3	287	490	32.9	Decayed 4/28/68: Apollo tracking network Test and Training Satellite
Kosmos 195	1967 124A	USSR	Dec 16	Plesetsk	SL-3	4,730	90.1	207	353	65.7	Reentered 12/23/67
Kosmos 196	1967 125A	USSR	Dec 19	Kapustin Yar	SL-7	352	95.5	223	860	49	Decayed 7/7/68
Kosmos 197	1967 126A	USSR	Dec 26	Kapustin Yar	SL-7	325	91.5	217	486	48.5	Decayed 1/30/68
Kosmos 198	1967 127A	USSR	Dec 27	Tyuratam	SL-11	4,540	103.4	889	948	65.1	In orbit: maneuvered
Surveyor 7	1968 1A	NASA	Jan 7	ETR	Atlas-Centaur	1,036	Flight time: 66.5 hours				Landed on moon 1/10/68: Surveyor program ends with 5th success in 7 tries
Explorer 36	1968 2A	NASA	Jan 11	WTR	TAID*	209	112.2	1,062	1,570	105.8	In orbit: GEOS 2 returning geodetic data
Kosmos 199	1968 3A	USSR	Jan 16	Plesetsk	SL-3	4,730	90.2	204	364	65.7	Decayed 2/1/68: probable recovery attempt failed
None	1968 4A	USAF	Jan 17	WTR	TAT-Agena D	1,500	94.5	450	546	75.1	Decayed 7/7/70
None	1968 5A	USAF	Jan 18	WTR	Titan IIIB-Agena D	3,000	90.1	138	404	111.5	Decayed 2/4/68
Kosmos 200	1968 6A	USSR	Jan 19	Plesetsk	SL-8	—	95.2	523	537	74	Decayed 2/24/73
Apollo 5	1968 7A	NASA	Jan 22	ETR	Uprated Saturn 1	14,360	89.5	162	214	31.6	Ascent stage decayed 1/24/68, descent stage 2/12/68; 1st successful lunar module flight test
None	1968 8A	USAF	Jan 24	WTR	LTTAT-Agena D	2,000	90.6	176	430	81.4	Decayed 2/27/68
None	1968 8B	USAF	Jan 24	WTR	LTTAT-Agena D	60	94.7	473	542	81.6	Decayed 3/4/70
Kosmos 201	1968 9A	USSR	Feb 6	Tyuratam	SL-3	4,730	89.9	204	337	65	Reentered 2/14/68
Luna 14-1	None	USSR	Feb 7	Tyuratam	SL-6						Lunar probe; failed to orbit
Kosmos 202	1968 10A	USSR	Feb 20	Kapustin Yar	SL-7	325	91.5	213	482	48.4	Decayed 3/24/68
Kosmos 203	1968 11A	USSR	Feb 20	Plesetsk	SL-8	600	109.2	1,181	1,200	74	In orbit
None	1968 12A	USAF	Mar 2	WTR	Scout	60	106.8	1,019	1,131	90	In orbit
Zond 4	1968 13A	USSR	Mar 2	Tyuratam	SL-12	5,375	Simulated translunar				Launched into undisclosed trajectory from initial parking orbit: probable precursor to manned lunar mission

*Thrust Augmented Improved Delta

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
OGO 5	1968 14A	NASA	Mar 4	ETR	Atlas-Agena D	634	3,795.9	232	148,228	31.1*	In orbit: Orbiting Geophysical Observatory carried 24 experiments
Kosmos 204	1968 15A	USSR	Mar 5	Plesetsk	SL-7	300	95.9	204	844	71	Decayed 3/2/69
Kosmos 205	1968 16A	USSR	Mar 5	Plesetsk	SL-3	4,730	89.4	199	292	65.7	Reentered 3/13/68
Explorer 37	1968 17A	USN/ NASA	Mar 5	WI	Scout	198	96.4	445	640	59.4	Solar Explorer B returned radiation data despite off-nominal orbit. Decayed 11/16/90
Kosmos	None	USSR	Mar 6	Kapustin Yar	SL-7						Failed to orbit
None	1968 18A	USAF	Mar 13	WTR	Titan IIIB-Agena D	3,000	89.9	128	407	99.9	Decayed 3/24/68
Kosmos 206	1968 19A	USSR	Mar 14	Plesetsk	SL-3	4,730	95.0	449	437	81.2	Metsat; returned weather and infrared photos, thermal data. Decayed 4/22/89
None	1968 20A	USAF	Mar 14	WTR	LTTAT-Agena D	2,000	90.2	178	391	83.0	Decayed 4/10/68
None	1968 20B	USAF	Mar 14	WTR	LTTAT-Agena D	60	94.6	481	522	83.1	Decayed 1/3/70
Kosmos 207	1968 21A	USSR	Mar 16	Plesetsk	SL-3	4,730	89.8	207	300	65.6	Reentered 3/24/68
Kosmos 208	1968 22A	USSR	Mar 21	Tyuratam	SL-3	4,730	89.4	208	274	65.0	Reentered 4/2/68
Kosmos 209	1968 23A	USSR	Mar 22	Tyuratam	SL-11	4,540	103.1	874	932	65.3	In orbit: maneuvered
Kosmos 210	1968 24A	USSR	Apr 3	Plesetsk	SL-3	4,730	90.3	200	373	81.2	Reentered 4/11/68
Apollo 6	1968 25A	NASA	Apr 4	ETR	Saturn V	36,806	88.2	205	392	32.5	Command module reentered 4/4/68: spacecraft performed well despite Saturn V 1st stage ``pogo'' effect, 2nd stage engine malfunction, 3rd stage failure to restart
OV1 13	1968 26A	USAF	Apr 6	WTR	Atlas F	107	199.1	581	9,242	99.9	In orbit: measured radiation below 5,000 mi; conducted engineering experiments
OV1 14	1968 26B	USAF	Apr 6	WTR	Atlas F	101	207.4	565	9,885	100.1	In orbit: measured radiation; power system failed after 1 week
Luna 14	1968 27A	USSR	Apr 7	Tyuratam	SL-6	1,700	Selenocentric Orbit				Studied earth-moon mass relationship, moon's gravitational field
Kosmos 211	1968 28A	USSR	Apr 9	Plesetsk	SL-7	250	102.5	199	1,532	81.9	Decayed 11/10/68

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 212	1968 29A	USSR	Apr 14	Tyuratam	SL-4	6,500	88.75	186	225	51.7	Soft-landed 4/19/68. Docked with Kosmos 213 4/15, 2nd USSR docking
Kosmos 213	1968 30A	USSR	Apr 15	Tyuratam	SL-4	6,500	89.16	193	245	51.4	Soft-landed 4/20/68: passive target for Kosmos 212; orbited together 3 hr 50 min
None	1968 31A	USAF	Apr 17	WTR	Titan IIIB-Agena D	3,000	90.1	134	427	111.5	Decayed 4/29/68
Kosmos 214	1968 32A	USSR	Apr 18	Plesetsk	SL-3	4,730	90.3	200	373	81.4	Reentered 4/26/68
Kosmos 215	1968 33A	USSR	Apr 19	Kapustin Yar	SL-7	385	91.1	255	403	48.5	Decayed 6/30/68: spin-stabilized radiation observatory carried 8 small telescopes
Kosmos 216	1968 34A	USSR	Apr 20	Tyuratam	SL-3	4,730	89.1	201	267	51.8	Reentered 4/28/68
Molniya 1H	1968 35A	USSR	Apr 21	Tyuratam	SL-6	1,750	713	391	39,738	65	Decayed 1/29/74: 8th Molniya commsat in Orbita network
Zond	None	USSR	Apr 22	Tyuratam	SL-12						Failed to orbit
Kosmos 217	1968 36A	USSR	Apr 24	Tyuratam	SL-11	4,000	93.4	144	262	62.2	Decayed 4/26/68
Kosmos 218	1968 37A	USSR	Apr 25	Tyuratam	SL-11	5,000	87.2	123	162	49.5	Decayed 4/25/68: possible FOBS reentry test
Kosmos 219	1968 38A	USSR	Apr 26	Kapustin Yar	SL-7	300	104.7	215	1,745	48.4	Decayed 3/2/69
None	1968 39A	USAF	May 1	WTR	LTTAT-Agena D	2,000	88.6	164	243	83	Decayed 5/15/68
Kosmos 220	1968 40A	USSR	May 7	Plesetsk	SL-8	775	98.5	654	723	74	In orbit
Iris (ESRO 2B)	1968 41A	ESRO*	May 17	WTR	Scout	75	98.9	334	1,085	97.2	Decayed 5/8/71: returned solar and cosmic radiation data
Nimbus B/ Secor 10	None	NASA/ USA	May 18	WTR	Thorad-Agena D	570/20	—	—	—	—	Failed to orbit: booster guidance malfunction forced payload destruct
None	1968 42A	USAF	May 23	WTR	Thor-Burner II	195	101.9	809	888	98.8	In orbit
Kosmos 221	1968 43A	USSR	May 24	Kapustin Yar	SL-7	250	108.3	218	2,0860	48.4	Decayed 8/31/69
Kosmos 222	1968 44A	USSR	May 30	Plesetsk	SL-7	325	92.3	285	488	71	Decayed 10/11/68
Kosmos 223	1968 45A	USSR	Jun 1	Plesetsk	SL-3	4,730	90.1	200	333	72.9	Reentered 6/9/68
Kosmos 224	1968 46A	USSR	Jun 4	Tyuratam	SL-3	4,730	89	203	256	51.8	Reentered 6/12/68

*European Space Research Organization

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1968 47A	USAF	Jun 5	WTR	Titan IIIB-Agena D	3,000	90.1	123	456	110.5	Decayed 6/17/68
Kosmos 225	1968 48A	USSR	Jun 11	Kapustin Yar	SL-7	375	92.2	255	512	48.4	Decayed 11/2/68
Kosmos 226	1968 49A	USSR	Jun 12	Plesetsk	SL-3	4,730	94.1	579	639	81.2	Decayed 10/18/83: 13th metsat; returned cloud cover photos, weather data
IDSCS 19 - 26	1968 50A -1968 50H	USAF	Jun 13	ETR	Titan IIIC	45 ea	Current elements not maintained				In orbit: supplements 18 defense satcoms previously launched
Kosmos	None	USSR	Jun 15	Tyuratam	SL-8						Failed to orbit
Kosmos 227	1968 51A	USSR	Jun 18	Tyuratam	SL-3	4,730	89.1	190	269	51.8	Reentered 6/26/68
None	1968 52A	USAF	Jun 20	WTR	LTTAT-Agena D	2,000	90.3	193	326	85.0	Decayed 7/16/68
None	1968 52B	USAF	Jun 20	WTR	LTTAT-Agena D	60	94.1	437	519	85.1	Decayed 1/11/70
Kosmos 228	1968 53A	USSR	Jun 21	Tyuratam	SL-4	5,900	89.0	199	252	51.6	Reentered 7/3/68
Kosmos 229	1968 54A	USSR	Jun 26	Plesetsk	SL-3	4,730	89.9	207	327	72.8	Reentered 7/4/68
Explorer 38	1968 55A	NASA	Jul 4	WTR	TAID	190	224.2	5,826	5,869	120.9	In orbit: Radio Astronomy Explorer 1 monitoring radio emissions from cosmic, solar, & earth sources
Kosmos 230	1968 56A	USSR	Jul 5	Kapustin Yar	SL-7	367	93	285	543	48.5	Decayed 11/2/68
Molniya 1I	1968 57A	USSR	Jul 5	Tyuratam	SL-6	1,750	713.8	401	39,803	65	Decayed 5/15/71: 9th Molniya 1 commsat
Kosmos 231	1968 58A	USSR	Jul 10	Tyuratam	SL-3	4,730	89.7	199	345	65	Reentered 7/18/68
OV1 15	1968 59A	USAF	Jul 11	WTR	Atlas F	470	103.8	154	1,818	89.8	Decayed 11/6/68: air- density/solar-radiation correlation experiment
OV1 16	1968 59B	USAF	Jul 11	WTR	Atlas F	600	91.0	163	554	89.7	Decayed 8/19/68: ionospheric drag experiment
Kosmos 232	1968 60A	USSR	Jul 16	Plesetsk	SL-3	4,730	89.8	189	248	65	Reentered 7/24/68
Kosmos 233	1968 61A	USSR	Jul 18	Plesetsk	SL-7	250	102.1	198	1,514	82	Decayed 2/7/69
Kosmos 234	1968 62A	USSR	Jul 30	Tyuratam	SL-3	4,730	89.5	208	288	51.8	Reentered 8/5/68
None	1968 63A	USAF	Aug 6	ETR	Atlas-Agena	1,000	Current elements not maintained				In orbit
None	1968 64A	USAF	Aug 6	WTR	Titan IIIB-Agena D	3,000	90.1	142	395	110.0	Decayed 8/16/68

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1968 65A	USAF	Aug 7	WTR	LTTAT-Burner II	3,000	88.4	152	257	82.0	Decayed 8/27/68
Explorer 39	1968 66A	NASA	Aug 8	WTR	Scout	9.3	104.8	633	1,341	80.6	Decayed 6/22/81: Air Density Explorer studied density & temperature variations at intermediate latitudes
Explorer 40	1968 66B	NASA	Aug 8	WTR	Scout	70	118.1	677	2,507	80.7	In orbit: Injun Explorer returning radiation data
Kosmos 235	1968 67A	USSR	Aug 9	Tyuratam	SL-3	4,730	89.4	201	281	51.8	Reentered 8/17/68
ATS 4	1968 68A	NASA	Aug 10	ETR	Atlas-Centaur	391	94.5	219	726	29.0	Decayed 10/17/68: 2nd stage failure to restart prevented reaching synchronous orbit
ESSA 7	1968 69A	ESSA	Aug 16	WTR	Long-Tank Delta	145	114.9	1,429	1,471	101.8	In orbit: replaced ESSA 5 as primary stored data satellite in TOS System (TOS E); one camera returned cloud cover photos, recorders failed; deactivated 7/19/69
OV5 8	None	USAF	Aug 16	WTR	Atlas-Burner II	9	—	—	—	—	Failed to orbit: materials friction experiment
Radcat	None	ARPA	Aug 16	WTR	Atlas-Burner II	179	—	—	—	—	Failed to orbit: radar calibration target
LCS	None	USAF	Aug 16	WTR	Atlas-Burner II	34	—	—	—	—	Failed to orbit: Lincoln Calibration Sphere for radar calibration experiment
Grid Sphere Drag	None	USAF	Aug 16	WTR	Atlas-Burner II	10 ea.	—	—	—	—	Failed to orbit: 4 spheres for drag coefficient experiment
Orbis-Cal 1	None	USN/ USAF	Aug 16	WTR	Atlas-Burner II	37	—	—	—	—	Failed to orbit: intended to measure effect of ionosphere on communication
Secor 11	None	USA	Aug 16	WTR	Atlas-Burner II	22	—	—	—	—	Failed to orbit: geodetic
Secor 12	None	USA	Aug 16	WTR	Atlas-Burner II	22	—	—	—	—	Failed to orbit: geodetic
Lidos	None	USN	Aug 16	WTR	Atlas-Burner II	117	—	—	—	—	Failed to orbit: to investigate earth's sphericity and gravitational fields
RM 18	None	USAF	Aug 16	WTR	Atlas-Burner II	51	—	—	—	—	Failed to orbit: IR & TV measurements of earth's IR background
UV Radiometer	None	USAF	Aug 16	WTR	Atlas-Burner II	—	—	—	—	—	Failed to orbit: shortwave radiation experiment
Kosmos 236	1968 70A	USSR	Aug 27	Tyuratam	SL-8	875	95.3	500	438	56.1	Probable navsat. Decayed 3/4/90
Kosmos 237	1968 71A	USSR	Aug 27	Plesetsk	SL-3	4,730	89.7	200	320	65.4	Reentered 9/4/68

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 238	1968 72A	USSR	Aug 28	Tyuratam	SL-4	6,520	88.5	194	313	51.7	Reentered 9/1/68: probable Soyuz precursor
Kosmos 239	1968 73A	USSR	Sep 5	Tyuratam	SL-3	4,730	89.2	203	269	51.8	Reentered 9/13/68
None	1968 74A	USAF	Sep 10	WTR	Titan IIIB-Agena D	3,000	89.1	125	404	106.0	Decayed 9/25/68
Kosmos 240	1968 75A	USSR	Sep 14	Tyuratam	SL-3	4,730	89.3	202	282	51.8	Reentered 9/21/68
Zond 5	1968 76A	USSR	Sep 14	Tyuratam	SL-12	5,375	—			51.5	Reentered 9/21/68: first lunar flyaround, recovered from Indian Ocean
Kosmos 241	1968 77A	USSR	Sep 16	Plesetsk	SL-3	4,730	89.7	202	322	65.4	Reentered 9/24/68
Intelsat III F-1	None	CSC	Sep 18	ETR	Long-Tank Delta	293	—	—	—	—	Failed to orbit: 1st launch attempt of Intelsat III series; pitch rate system malfunction forced payload destruct
None	1968 78A	USAF	Sep 18	WTR	TAT-Agena D	2,000	90.1	167	393	83.0	Decayed 10/8/68
None	1968 78B	USAF	Sep 18	WTR	TAT-Agena D	60	94.7	500	514	83.2	Decayed 9/28/69
Kosmos 242	1968 79A	USSR	Sep 20	Plesetsk	SL-7	325	91.3	272	406	71.0	Decayed 11/13/68: probable scientific
Kosmos 243	1968 80A	USSR	Sep 23	Tyuratam	SL-4	5,900	89.6	213	293	71.3	Reentered 10/4/68
OV2 5	1968 81A	USAF	Sep 26	ETR	Titan IIIC	204	Current elements not maintained				In orbit: environmental research; carried 11 experiments
OV5 2	1968 81B	USAF	Sep 26	ETR	Titan IIIC	10	630.3	184	35,787	26.4	Decayed 2/15/71, monitored particle radiation (ERS 28); all OV's deactivated
OV5 4	1968 81C	USAF	Sep 28	ETR	Titan IIIC	13	Current elements not maintained				In orbit: obtained data on heat transfer to a liquid under zero-g conditions (ERS 21)
LES 6	1968 81D	USAF	Sep 26	ETR	Titan IIIC	163	1,436.7	35,752	35,843	10.0	In orbit: 6th solid-state experimental tactical commsat
Kosmos 244	1968 82A	USSR	Oct 2	Tyuratam	SL-11	5,000	—	134	158	50	Decayed 10/2/68: possible FOBS reentry test
Kosmos 245	1968 83A	USSR	Oct 3	Plesetsk	SL-7	325	92.1	284	473	71	Decayed 1/15/69
Aurorae (ESRO 1A)	1968 84A	ESRO	Oct 3	WTR	Scout	81	102.8	258	1,538	93.7	Decayed 6/26/70: investigated auroral phenomena & polar ionosphere
Molniya 1J	1968 85A	USSR	Oct 5	Tyuratam	SL-6	1,750	712	436	39,633	65	Decayed 7/16/76: 10th Molniya 1
None	1968 86A	USAF	Oct 5	WTR	LTTAT-Agena D	2,000	94.5	483	511	75.0	Decayed 3/26/71
Kosmos 246	1968 87A	USSR	Oct 7	Plesetsk	SL-3	4,730	89.4	149	321	65.4	Reentered 10/12/68

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 247	1968 88A	USSR	Oct 11	Plesetsk	SL-3	4,730	89.9	199	345	65.4	Reentered 10/19/68
Apollo 7	1968 89A	NASA	Oct 11	ETR	Saturn 1B	14,674	89.7	231	297	31.64	Reentered 10/22/68: Wally Schirra, Walt Cunningham, Donn Eisele completed near-flawless 1st manned flight of Apollo; recovered after 163 orbits, 260.2 hrs
Kosmos 248	1968 90A	USSR	Oct 19	Tyuratam	SL-11	4,000	94.8	475	543	62.3	Decayed 2/23/80: ASAT target. Destroyed 11/1; 5 pieces
Kosmos 249	1968 91A	USSR	Oct 20	Tyuratam	SL-11	3,320	111.8	517	2,092	62.4	In orbit: ASAT warhead, 60 pieces
None	1968 92A	USAF	Oct 23	WTR	Thor-Burner II	195	101.2	792	838	98.5	In orbit
Soyuz 2	1968 93A	USSR	Oct 25	Tyuratam	SL-4	6,520	88.5	196	200	51.7	Reentered 10/28/68: rendezvous target for Soyuz 3; unmanned
Soyuz 3	1968 94A	USSR	Oct 26	Tyuratam	SL-4	6,575	88.6	177	203	51.4	Reentered 10/30/68: Georgi Beregovoi maneuvered to 650 ft from Soyuz 2, landed after 64 orbits, 94.9 hrs
Kosmos 250	1968 95A	USSR	Oct 30	Plesetsk	SL-8	875	95.3	522	542	74	Decayed 2/15/78: possible navsat
Kosmos 251	1968 96A	USSR	Oct 31	Tyuratam	SL-4	6,300	89.1	201	255	65	Reentered 11/18/68
Kosmos 252	1968 97A	USSR	Nov 1	Tyuratam	SL-11	3,320	112.2	551	2,102	62.3	ASAT warhead, 56 pieces in orbit
None	1968 98A	USAF	Nov 3	WTR	TAT-Agena D	2,000	88.7	150	288	82.1	Decayed 11/23/68
None	1968 99A	USAF	Nov 6	WTR	Titan IIIB-Agena D	3,000	88.6	130	390	106.0	Decayed 11/20/68
Pioneer 9	1968 100A	NASA	Nov 8	ETR	TAID	63	297.5 days	0.75 AU	1.0 AU	—	In solar orbit: 8 experiments provided data on solar radiation. Pronounced dead 3/3/87 after 18.5 yrs of service
TETR 2	1968 100B	NASA	Nov 8	ETR	TAID	40	97.9	378	940	32.8	Decayed 9/19/79: 2nd orbiting target for NASA's Manned Space Flight Network, Test and Training satellite
Zond 6	1968 101A	USSR	Nov 10	Tyuratam	SL-12	5,375	Circumlunar				Reentered 11/17/68: 2nd unmanned circumlunar flight; landed in USSR after double-dip glide reentry, aerodynamic lift for deceleration
Kosmos 253	1968 102A	USSR	Nov 13	Plesetsk	SL-3	4,730	89.9	200	333	65.4	Reentered 11/18/68

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Proton 4	1968 103A	USSR	Nov 16	Tyuratam	SL-13	17,000	91.75	248	477	31.5	Decayed 7/24/69: performed cosmic ray measurements
Kosmos 254	1968 104A	USSR	Nov 21	Plesetsk	SL-3	4,730	89.8	197	335	65.4	Reentered 11/29/68
Kosmos 255	1968 105A	USSR	Nov 29	Plesetsk	SL-3	4,730	89.7	197	317	65.4	Reentered 12/7/68
Kosmos 256	1968 106A	USSR	Nov 30	Plesetsk	SL-8	600	109.3	1,170	1,222	74.1	In orbit
STV 1 (F-7)	None	ELDO*	Nov 30	Woomera	Europa 1	249	—	—	—	—	Failed to orbit: premature 3rd stage shutdown foiled launch of Satellite Test Vehicle; 7th Europa 1 launch test, 1st orbital try
Kosmos 257	1968 107A	USSR	Dec 3	Plesetsk	SL-7	325	91.7	286	462	71	Decayed 3/5/69
None	1968 108A	USAF	Dec 4	WTR	Titan IIIB-Agena D	3,000	91.9	136	736	106.1	Decayed 12/12/68
HEOS 1	1968 109A	ESRO	Dec 5	ETR	TAID	108	6792.7	2,418	223,440	28.2	Decayed 10/28/75: Highly Eccentric Orbiting Satellite studied magnetic fields outside earth's magnetosphere
OAO A2	1968 110A	NASA	Dec 7	ETR	Atlas-Centaur	2,012	100.2	761	770	35.0	In orbit: Orbiting Astronomical Observatory with 11 telescopes studying stars in UV, IR, gamma & X-ray
Kosmos 258	1968 111A	USSR	Dec 10	Tyuratam	SL-3	4,730	89.6	202	282	65	Reentered 12/18/68
None	1968 112A	USAF	Dec 12	WTR	LTTAT-Agena D	2,000	88.6	169	248	81.0	Reentered 12/28/68
None	1968 112B	USAF	Dec 12	WTR	LTTAT-Agena D	60	114.3	1,380	1,469	80.4	In orbit
Kosmos 259	1968 113A	USSR	Dec 14	Kapustin Yar	SL-7	325	100.3	246	1,308	48.5	Decayed 5/5/69
ESSA 8	1968 114A	ESSA	Dec 15	WTR	Long-Tank Delta	132	114.6	1,411	1,461	101.2	In orbit: Metsat
Kosmos 260	1968 115A	USSR	Dec 16	Tyuratam	SL-6	1,750	712	518	39,570	65	Decayed 7/9/73: possible Molniya failure
Intelsat III F-2	1968 116A	CSC	Dec 19	ETR	Long-Tank Delta	293	1,436	35,770	35,790	0.7**	In orbit: 1st successful launch for Intelsat III full-global system; positioned off coast of Brazil. Developed temporary antenna malfunction 6/29/69

*European Launcher Development Organization

**Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 261	1968 117A	USSR	Dec 20	Plesetsk	SL-7	347	93.1	207	642	71	Decayed 2/12/69: Soviet bloc joint experiments in air density, polar auroras
Apollo 8	1968 118A	NASA	Dec 21	ETR	Saturn V	28,833	88.15	191	191	32.6	Reentered 12/27/68: 1st manned circumlunar flight; Frank Borman, James Lovell, William Anders recovered in mid-Pacific after 10 lunar orbits, 147 hrs
Kosmos 262	1968 119A 1969	USSR	Dec 26	Kapustin Yar	SL-7	352	95.2	259	798	48.5	Decayed 7/18/69
Venera 5	1969 1A	USSR	Jan 5	Tyuratam	SL-6	1,128	Flight time: 131 days				Descent capsule entered Venusian atmosphere 5/16/69: penetrated deeper than Venera 4; aerodynamic and parachute descent; presumed impact
Venera 6	1969 2A	USSR	Jan 10	Tyuratam	SL-6	1,128	Flight Time: 127 days				Descent capsule entered Venusian aunosphere 5/17/69: penetrated deeper than Venera 4; aerodynamic and parachute descent; presumed impact
Kosmos 263	1969 3A	USSR	Jan 12	Plesetsk	SL-3	4,730	89.8	200	325	65.4	Reentered 1/20/69
Soyuz 4	1969 4A	USSR	Jan 14	Tyuratam	SL-4	6,625	88.3	161	215	51.70	Reentered 1/17/69: Vladimir Shatalov performed manual dock- ing with Soyuz 5 in 1st link-up of 2 manned vehicles; landed with 2 Soyuz 5 cosmonauts on 48th orbit after 71.2 hrs
Soyuz 5	1969 5A	USSR	Jan 15	Tyuratam	SL-4	6,585	88.7	124	143	51.70	Reentered 1/18/69: Yevgeni Khrunov, Alexei Yeliseyev performed 1 hr EVA, transferred to Soyuz 4 in emergency rescue rehearsal; Boris Volynov landed alone after 50th orbit; 72.8 hrs
Zond	None	USSR	Jan 20	Tyuratam	SL-12						Lunar probe; 2nd stage failure
OSO 5	1969 6A	NASA	Jan 22	ETR	Delta	291	93.4	536	561	33.0	Decayed 4/2/84. Orbiting Solar Observatory returned solar radiation data
None	1969 7A	USAF	Jan 22	WTR	Titan IIIB-Agena D	3,000	96.9	132	1,090	106.1	Decayed 2/3/69
Kosmos 264	1969 8A	USSR	Jan 23	Tyuratam	SL-3	4,730	89.7	209	295	70	Reentered 2/5/69

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	None	USSR	Jan 24	Tyuratam	SL-11						Failed to orbit
ISIS 1	1969 9A	Can	Jan 30	WTR	TAID	241	128.1	575	3,494	88.4	In orbit: continuing ionospheric studies begun with Alouette 1
None	1969 10A	USAF	Feb 5	WTR	LTTAT-Agena D	2,000	88.7	178	239	81.5	Decayed 2/24/69
None	1969 10B	USAF	Feb 5	WTR	LTTAT-Agena D	60	114.0	1,393	1,430	80.4	In orbit
Intelsat III F-3	1969 11A	CSC	Feb 6	ETR	LTTA-* Delta	293	1,436.4	35,782	35,808	1.3**	In orbit: 2nd successful launch of Intelsat III; initially located over Pacific; repositioned over Indian Ocean, at 63 degrees e long
Kosmos 265	1969 12A	USSR	Feb 7	Plesetsk	SL-7	325	91.9	275	458	71	Decayed 5/1/69
Tacsat 1	1969 13A	USAF	Feb 9	ETR	Titan IIIC	730	Current elements not maintained				In orbit: experimental military commsat (formerly Tacomsat)
None	None	USSR	Feb 20	Tyuratam	SL-15						Lunar program. 1st stage failure
Mariner 6	1969 14A	NASA	Feb 24	ETR	Atlas-Centaur	412	Heliocentric Orbit				Flew over Mars equator 2,120 mi, 7/31/69; sent 75 TV pictures at 42.3 sec intervals (See Mariner 7)
Kosmos 266	1969 15A	USSR	Feb 25	Plesetsk	SL-3	4,730	89.9	202	236	72.9	Reentered 3/5/69
ESSA 9	1969 16A	ESSA	Feb 26	ETR	TAID	145	115.2	1,423	1,502	102	In orbit: final ESSA launch in TOS System replaced ESSA 7; fully operational, carries AVCS
Kosmos 267	1969 17A	USSR	Feb 26	Tyuratam	SL-3	4,730	89.9	205	329	65	Reentered 3/6/69
Apollo 9 **LM** **S-4-B**	1969 18A 1969 18C	NASA	Mar 3	ETR	Saturn V	36,511	89.0 164.7	203 227 Escape trajectory	229 6,935	32.6 28.9	Reentered 3/13/69: James McDivitt, David Scott, Russell Schweickart aboard. 1st manned flight of Apollo LM; splashdown after 151 orbits, 241.9 hr, including 40-min EVA
None	1969 19A	USAF	Mar 4	WTR	Titan IIIB-Agena D	—	90.2	134	481	92	Decayed 3/18/69
Kosmos 268	1969 20A	USSR	Mar 5	Kapustin Yar	SL-7	250	109.2	209	2,173	48.4	Decayed 5/9/70: possible space physics experiments

*Long Tank Thrust Augmented

**Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 269	1969 21A	USSR	Mar 5	Plesetsk	SL-8	875	95.3	525	543	74	Decayed 10/21/78: possible navsat
Kosmos 270	1969 22A	USSR	Mar 6	Plesetsk	SL-3	4,730	89.8	200	331	65.4	Reentered 3/14/69
Kosmos 271	1969 23A	USSR	Mar 15	Plesetsk	SL-3	4,730	89.7	196	324	65.4	Reentered 3/21/69
Kosmos 272	1969 24A	USSR	Mar 17	Plesetsk	SL-8	600	109.2	1,177	1,206	74	In orbit: possible navsat
OV1 17	1969 25A	USAF	Mar 18	WTR	Atlas F	142	93.2	397	463	99.1	Decayed 3/5/70: 12 solar radiation experiments
OV1 18	1969 25B	USAF	Mar 18	WTR	Atlas F	125	95	466	583	98.8	Decayed 8/27/72: studied ionosphere; measured radio interference, electric fields, radiation
OV1 19	1969 25C	USAF	Mar 18	WTR	Atlas F	124	152.4	470	5,677	104.7	In orbit: 7 experiments studied trapped radiation, 5 studied radiation hazards
OV1 17A (Orbis-Cal 2)	1969 25D	USAF	Mar 18	WTR	Atlas F	221	89.8	175	309	99	Decayed 3/24/69: 2 radio beacons mounted on OV1 17 propulsion module
None	1969 26A	USAF	Mar 19	WTR	LTTAT-Agena D	2,000	86.6	179	241	82.9	Decayed 3/24/69
None	1969 26B	USAF	Mar 19	WTR	LTTAT-Agena D	60	94.7	504	513	83	Decayed 12/6/71
Kosmos 273	1969 27A	USSR	Mar 22	Plesetsk	SL-3	4,730	89.9	198	329	65.4	Reentered 3/30/69
Kosmos 274	1969 28A	USSR	Mar 24	Tyuratam	SL-3	4,730	89.6	206	300	65	Reentered 4/1/69
Meteor 1	1969 29A	USSR	Mar 26	Plesetsk	SL-3	3,800	97.1	600	639	81.2	In orbit: metsat, returned cloud, snow, ice cover data during daylight & dark. Booster exploded 3/28, 38 pieces
Mars	None	USSR	Mar 27	Tyuratam	SL-12						Mars probe; failed to orbit
Mariner 7	1969 30A	NASA	Mar 27	ETR	Atlas-Centaur	412	Heliocentric Orbit				Flew over Mars southern hemisphere at 3,524 km, 8/5/69; sent 126 TV pictures, (See Mariner 6)
Kosmos 275	1969 31A	USSR	Mar 28	Plesetsk	SL-7	300	95.2	273	780	71	Decayed 2/7/70: possible solar flare monitor
Kosmos 276	1969 32A	USSR	Apr 4	Plesetsk	SL-3	4,730	90.4	200	371	81.4	Reentered 4/11/69
Kosmos 277	1969 33A	USSR	Apr 4	Plesetsk	SL-7	325	92	268	466	71	Decayed 7/6/69
Kosmos 278	1969 34A	USSR	Apr 9	Plesetsk	SL-3	4,730	89.7	196	310	65	Reentered 4/17/69
Molniya 1K	1969 35A	USSR	Apr 11	Tyuratam	SL-6	1,750	713	404	39,741	65	Decayed 4/17/74: 11th Molniya 1
None	1969 36A	USAF	Apr 13	ETR	Atlas-Agena D	700	Current elements not maintained				In orbit

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Nimbus 3	1969 37A	NASA	Apr 14	WTR	Thorad-Agena D	575	107.3	1,070	1,130	99.6	In orbit: 3rd metsat returned IR, UV, geodetic, and TV data
Secor 13	1969 37B	USA	Apr 14	WTR	Thorad-Agena D	20	107.2	1,068	1,128	99.6	In orbit: Army geodetic; deactivated
Kosmos 279	1969 38A	USSR	Apr 15	Tyuratam	SL-3	4,730	89.1	192	267	51.8	Reentered 4/23/69
None	1969 39A	USAF	Apr 15	WTR	Titan IIIB-Agena D	3,000	89.9	135	410	108.7	Decayed 4/30/69
Kosmos 280	1969 40A	USSR	Apr 23	Tyuratam	SL-4	6,300	89.1	207	250	51.6	Reentered 5/6/69
None	1969 41A	USAF	May 2	WTR	Thorad-Agena D	2,000	89.4	179	326	65.4	Decayed 5/23/69
None	1969 41B	USAF	May 2	WTR	Thorad-Agena D	60	93.3	401	473	65.7	Decayed 2/16/70
Kosmos 281	1969 42A	USSR	May 13	Plesetsk	SL-3	4,730	89.9	191	303	65.4	Reentered 5/21/69
Apollo 10 **LM Ascent**	1969 43A 1969 43D	NASA	May 18	ETR	Saturn V	42,530	88.1	183 Escape trajectory	184	32.5	Reentered 5/26/69: 2nd manned U.S. circumlunar flight: LM piloted w/in 14.9 km of moon on 5/22/69. Thomas Stafford, John Young, Eugene Cernan splashed down after 192.1 hr; 1st color TV from space
Kosmos 282	1969 44A	USSR	May 20	Plesetsk	SL-3	4,730	89.9	202	321	65.4	Reentered 5/28/69
Intelsat III F-4	1969 45A	CSC	May 22	ETR	LTTA-Delta	293	1,418.9	35,276	35,670	0.5*	In orbit: 3rd successful Intelsat III; stationed at 174 deg. e long. over Pacific. With Intelsat IIIC, completed 1st global commercial communications satellite system
Vela 9	1969 46A	USAF	May 23	ETR	Titan IIIC	259	Current elements not maintained				In orbit: advanced nuclear test detection satellite
Vela 10	1969 46B	USAF	May 23	ETR	Titan IIIC	259	Current elements not maintained				In orbit: same as above, positioned 180 degrees behind Vela 9
OV5 5	1969 46C	USAF	May 23	ETR	Titan IIIC	11	Current elements not maintained				In orbit: VLF plasma wave detector for deep space; also identified as ERS 29

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
OV5 6	1969 46D	USAF	May 23	ETR	Titan IIIC	10	Current elements not maintained				In orbit: solar flare particle detectors
OV5 9	1969 46E	USAF	May 23	ETR	Titan IIIC	13	Current elements not maintained				In orbit: solar flare, radiation, and low-energy detectors
Kosmos 283	1969 47A	USSR	May 27	Plesetsk	SL-7	250	102.1	199	1,501	82	Decayed 12/10/69
Kosmos 284	1969 48A	USSR	May 29	Tyuratam	SL-3	4,730	89.5	205	294	51.8	Reentered 6/6/69
Kosmos 285	1969 49A	USSR	Jun 3	Plesetsk	SL-7	325	92.2	267	493	71	Decayed 10/7/69: possible solar flare monitor
None	1969 50A	USAF	Jun 3	WTR	Titan IIIB-Agena D	3,000	89.7	137	414	109.9	Decayed 6/14/69
Luna 15-2		USSR	Jun 4	Tyuratam	SL-12						Lunar probe; failed to orbit
OGO 6	1969 51A	NASA	Jun 5	WTR	LTTAT-Agena D	634	99.6	397	1,089	81.9	Decayed 10/12/79: geophysical observatory, completed launch program; 23 of 25 experiments returned data; celestial lyman-alpha experiment returned data until 6/23/69
Kosmos 286	1969 52A	USSR	Jun 15	Plesetsk	SL-3	4,730	89.8	200	327	65.4	Reentered 6/23/69
Explorer 41	1969 53A	NASA	Jun 21	WTR	TAID	174	4840	378	176,434	83.8	Decayed 12/23/72: returned cislunar space radiation data; IMP G
Kosmos 287	1969 54A	USSR	Jun 24	Tyuratam	SL-3	4,730	89	188	264	51.8	Reentered 7/2/69
Kosmos 288	1969 55A	USSR	Jun 27	Tyuratam	SL-3	4,730	89.2	199	273	51.8	Reentered 7/5/69
Biosatellite 3	1969 56A	NASA	Jun 29	ETR	LTTA-Delta N	695	92	221	240	33.5	Decayed 1/20/70: experiment capsule reentered 7/7/69: mission shortened to 9 days; in-flight experiment data satisfactory for brief mission
STV 2 (F-8)	None	ELDO	Jul 2	Woomera	Europa 1	249	—	—	—	—	Failed to orbit: 3rd stage did not ignite; second ELDO attempt to launch Satellite Test Vehicle (STV); 8th test of Europa 1
None	None	USSR	Jul 3	Tyuratam	SL-15						2nd of Saturn-type boosters; failed to orbit
Kosmos 289	1969 57A	USSR	Jul 10	Plesetsk	SL-3	4,730	102.1	194	325	82	Reentered 7/15/69
Luna 15	1969 58A	USSR	Jul 13	Tyuratam	SL-12	2,718	Flight Time: 204 hr, 56 mn				Crashed on Moon 7/21/69 after 52 orbits around it. Orbit altered twice unlike Luna 9 & 13

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Apollo 11	1969 59A	NASA	Jul 16	ETR	Saturn V	43,811	—	183	184	32.7	Reentered 7/24/69: 1st manned lunar landing 7/20/69. 2.5-hr EVA by Neil Armstrong, Edwin Aldrin. Eagle landed in Sea of Tranquility, stayed 21.6 hr. CM pilot Michael Collins in lunar orbit 59.5 hr; splashdown after 195.31 hr
EALSEP		NASA	Jul 20				23.49 e, 0.67 n (lunar surface)				Science Station data until 9/69
Kosmos 290	1969 60A	USSR	Jul 22	Plesetsk	SL-3	4,730	89.8	195	332	65.4	Reentered 7/30/69
Molniya 1L	1969 61A	USSR	Jul 22	Tyuratam	SL-6	1,750	711	499	39,519	64.9	Decayed 6/18/71: 12th Molniya 1
None	1969 62A	USAF	Jul 23	WTR	Thor-Burner II	195	101.1	775	844	98.5	In orbit
None	1969 63A	USAF	Jul 24	WTR	Thorad-Agena D	2,000	88.4	178	220	74.9	Decayed 8/23/69
Intelsat III F-5	1969 64A	CSC	Jul 26	ETR	LTTA-Delta	269	115.3	252	1,301	30.3	Unusable, 3rd stage malfunction placed it in incorrect orbit. Decayed 10/14/88
None	1969 65A	USAF	Jul 31	WTR	Thorad-Agena D	2,000	94.6	462	541	75.0	Decayed 1/4/73
Kosmos 291	1969 66A	USSR	Aug 6	Tyuratam	SL-11	4,000	91.5	147	548	62.3	Decayed 9/8/69
Zond 7	1969 67A	USSR	Aug 7	Tyuratam	SL-12	5,979	88.2	115.6	116.2	51.4	Reentered 8/14/69: 3rd unmanned circumlunar flight; recovered in USSR
OSO 6	1969 68A	NASA	Aug 9	ETR	LTTA-Delta N	290	91.1	491	554	33.0	Decayed 3/7/81: Advanced solar physics research platform; main new ability is offset raster scan and scan near edge of sun's disk
PAC 1	1969 68B	NASA	Aug 9	ETR	LTTA-Delta N	120	95.0	485	554	32.9	Decayed 4/28/77: test of semi-active gravity-gradient stabilization (SAGS) technique, Package Attitude Control
ATS 5	1969 69A	NASA	Aug 12	ETR	Atlas-Centaur	821	1436.3	34,382	38,298	7.0	In orbit: near 108 degrees w long. off west coast of S.A. in synchronous orbit; malfunction of nutation damper caused flat spin; partial success
Kosmos 292	1969 70A	USSR	Aug 13	Plesetsk	SL-8	775	99.6	731	749	74	In orbit

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 293	1969 71A	USSR	Aug 16	Tyuratam	SL-4	5,900	89.1	208	256	51.8	Reentered 8/28/69
Kosmos 294	1969 72A	USSR	Aug 19	Plesetsk	SL-3	4,730	89.8	200	329	65.4	Reentered 8/27/69
Kosmos 295	1969 73A	USSR	Aug 22	Plesetsk	SL-7	325	92	270	469	71	Decayed 12/1/69: possible co-orbital test
None	1969 74A	USAF	Aug 23	WTR	Titan IIIB-Agena D	3,000	89.7	133	366	108.0	Decayed 9/7/69
Pioneer E/ TETR C	None	NASA	Aug 27	ETR	LTTA-Delta	67/20	—	—	—	—	Failed to orbit: 1st stage hydraulics failure forced destruction after 8 min 3 sec
Kosmos 296	1969 75A	USSR	Aug 29	Tyuratam	SL-3	4,730	89.6	207	302	65	Reentered 9/6/69
Kosmos 297	1969 76A	USSR	Sep 2	Plesetsk	SL-3	4,730	89.7	205	309	72.9	Reentered 9/10/69
Kosmos 298	1969 77A	USSR	Sep 15	Tyuratam	SL-11	5,000	87.3	127	162	49.6	Decayed 9/15/69
Kosmos 299	1969 78A	USSR	Sep 18	Tyuratam	SL-3	4,730	89.5	207	284	65	Reentered 9/22/69
Lambda 4S-4	None	Japan	Sep 22	Uchinoura	Lambda 4S	25	—	—	—	—	Failed to orbit: 4th launch failure of Lambda vehicle; attributed to attitude control system in 4th stage
None	1969 79A	USAF	Sep 22	WTR	Thorad-Agena D	2,000	88.7	178	253	85.0	Decayed 10/12/69
None	1969 79B	USAF	Sep 22	WTR	Thorad-Agena D	60	94.4	490	496	85.1	Decayed 5/16/71
Kosmos 300	1969 80A	USSR	Sep 23	Tyuratam	SL-12	5,600	88.2	184	189	51.5	Decayed 9/27/69: possible lunar test
Kosmos 301	1969 81A	USSR	Sep 24	Plesetsk	SL-3	4,730	89.4	195	289	65.4	Reentered 10/2/69
None	1969 82A	USAF	Sep 30	WTR	Thorad-Agena D	60	93.8	446	484	69.6	Decayed 10/30/70
None	1969 82B-K	USAF	Sep 30	WTR	Thorad-Agena D	—	Current elements not maintained				In orbit: 9 subsatellites. Booster exploded 10/4. 126 pieces in orbit
Boreas (ESRO 1B)	1969 83A	ESRO	Oct 1	WTR	Scout	80	92.0	291	389	86.0	Decayed 11/23/69: ionospheric and auroral experiments; early decay due to booster malfunction

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Meteor 2	1969 84A	USSR	Oct 6	Plesetsk	SL-3	3,800	96.8	573	613	81.2	In orbit: metsat to expand weather service; monitors cloud and ice cover, IR, & thermal energy reflected and radiated from earth's atmosphere
Soyuz 6	1969 85A	USSR	Oct 11	Tyuratam	SL-4	6,577	88.4	192	231	51.7	Reentered 10/16/69: began world's 1st triple launch of manned ships, a record 7 people. Georgi Shonin, Valeri Kubasov conducted automatic welding experiments. 80 orbits, 118.7 hrs
Soyuz 7	1969 86A	USSR	Oct 12	Tyuratam	SL-4	6,570	88.6	210	223	51.7	Reentered 10/17/69: Anatoli Filipchenko, Vladislav Volkov, Viktor Gorbatko did autonomous navigation experiments, studies and photographs; passive in maneuvers. Soft-landed after 80 orbits, 118.7 hrs
Soyuz 8	1969 87A	USSR	Oct 13	Tyuratam	SL-4	6,646	88.6	201	227	51.7	Reentered 10/18/69: Vladimir Shatalov, Alexei Yeliseyev did multiple maneuvering with Soyuz 7, probable docking failure. 80 orbits, 118.7 hrs
Interkosmos 1	1969 88A	USSR	Oct 14	Kapustin Yar	SL-7	320	93.3	254	626	48.4	Reentered 1/2/70: int'l experiments from 3 East European countries to study sun's UV, X-ray effects on upper atmosphere
Kosmos 302	1969 89A	USSR	Oct 17	Plesetsk	SL-3	4,730	89.7	198	321	65.4	Reentered 10/25/69
Kosmos 303	1969 90A	USSR	Oct 18	Plesetsk	SL-7	325	92.0	270	466	71.0	Decayed 1/23/70
Kosmos 304	1969 91A	USSR	Oct 21	Plesetsk	SL-8	795	99.7	734	754	74.0	In orbit: possible navigation/geodetic
Kosmos 305	1969 92A	USSR	Oct 22	Tyuratam	SL-12	5,600	88.4	175	206	51.5	Decayed 10/24/69: possible lunar mission test; two modules
Kosmos 306	1969 93A	USSR	Oct 24	Tyuratam	SL-4	5,700	89.7	215	299	65.0	Reentered 11/5/69
Kosmos 307	1969 94A	USSR	Oct 24	Kapustin Yar	SL-7	250	109.1	214	2,157	48.4	Decayed 12/30/70: possible radiation and geo-astrophysical research mission
None	1969 95A	USAF	Oct 24	WTR	Titan IIIB-Agena D	3,000	92.1	136	740	108.0	Decayed 11/8/69
Kosmos 308	1969 96A	USSR	Nov 4	Plesetsk	SL-7	325	91.3	271	408	71.0	Decayed 1/5/70

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Azur 1 (GRS A)	1969 97A	Ger	Nov 8	WTR	Scout	71	115.2	379	2,550	102.8	In orbit: contains 7 experiments to study Van Allen belts, auroral, solar particles (German Research Satellite A)
Kosmos 309	1969 98A	USSR	Nov 12	Plesetsk	SL-4	5,900	90.1	185	364	65.4	Reentered 11/20/69
Apollo 12	1969 99A	NASA	Nov 14	ETR	Saturn V	43,848	88.1	183	199	—	Reentered 11/24/69: 2nd manned lunar landing 11/19/69; 2 EVA's by Pete Conrad, Alan Bean, 11/99 and 11/20. LM "Intrepid" landed in Ocean of Storms, stayed 31.6 hr; CM "Yankee Clipper" pilot Richard Gordon in lunar orbit 89 hrs; splashdown after 244.6 hr
ALSEP 12		NASA					23.45 w, 2.94 s (lunar surface)				Science station data until 10/1/77
Kosmos 310	1969 100A	USSR	Nov 15	Tyuratam	SL-3	4,730	89.8	204	336	65.0	Reentered 11/23/69
Skynet 1	1969 101A	UK	Nov 22	ETR	Delta	243	1,407.8	34,702	35,838	2.4*	In orbit: 1st scheduled launch of synchronous military defense satcoms for Britain; positioned over Indian Ocean
Kosmos 311	1969 102A	USSR	Nov 24	Plesetsk	SL-7	325	92.0	273	489	71.0	Decayed 3/10/70
Kosmos 312	1969 103A	USSR	Nov 24	Plesetsk	SL-8	600	108.6	1,140	1,173	74.0	In orbit: possible navigation/geodetic
Kosmos 313	1969 104A	USSR	Dec 3	Plesetsk	SL-4	5,700	89.1	198	250	65.4	Reentered 12/15/69
None	1969 105A	USAF	Dec 4	WTR	Thorad-Agena D	2,000	88.5	159	251	81.5	Decayed 1/10/70
Kosmos 314	1969 106A	USSR	Dec 11	Plesetsk	SL-7	325	91.9	272	485	71.0	Decayed 3/22/70
Kosmos 315	1969 107A	USSR	Dec 20	Plesetsk	SL-8	325	95.3	518	542	74.1	Decayed 3/25/79: possible navigation/geodetic
Kosmos 316	1969 108A	USSR	Dec 23	Tyuratam	SL-11	3,640	102.7	152	1,638	49.5	Decayed 8/28/70: possible maneuverable test; not believed successfully orbited
Kosmos 317	1969 109A	USSR	Dec 23	Plesetsk	SL-4	6,300	89.4	205	280	65.4	Reentered 1/5/70
Interkosmos 2	1969 110A	USSR	Dec 25	Kapustin Yar	SL-7	320	98.5	200	1,178	48.4	Decayed 6/7/70: 2nd international satellite carrying East European-made ionospheric observation and survey equipment

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 318	1970 1A	USSR	Jan 9	Tyuratam	SL-4	5,700	89.3	203	277	65.0	Reentered 1/21/70
None	1970 2A	USAF	Jan 14	WTR	Titan IIIB-Agena D	3,000	89.69	134	383	109.9	Decayed 2/1/70
Intelsat III F-6	1970 3A	CSC	Jan 15	ETR	TAT-Delta	293	1,436.1	35,773	35,801	0.9*	In orbit: 6th in Intelsat III series; stationed at 336 deg. e long. over Atlantic
Kosmos 319	1970 4A	USSR	Jan 15	Plesetsk	SL-7	250	102	200	1,508	82.0	Decayed 7/1/70
Kosmos 320	1970 5A	USSR	Jan 16	Kapustin Yar	SL-7	375	90	247	326	48.5	Decayed 2/10/70
Kosmos 321	1970 6A	USSR	Jan 20	Plesetsk	SL-7	365	92	272	479	71.0	Decayed 3/23/70
Kosmos 322	1970 7A	USSR	Jan 21	Plesetsk	SL-3	4,730	89.7	195	319	65.4	Reentered 1/29/70
ITOS-1 (Tiros M)	1970 8A	NASA	Jan 23	WTR	TAT-Delta M	309	115.0	1,432	1,477	101.8	In orbit: 1st of 2nd generation metsats; became operational 6/15/70. Improved TIROS Operational Satellite
Oscar 5	1970 8B	Aust	Jan 23	WTR	TAT-Delta M	18	115.0	1,432	1,476	101.8	In orbit: 5th amateur radio commsat, transmitted 46 days
SERT 2	1970 9A	USAF	Feb 4	WTR	TAT-Delta-Agena D	1,404	106.0	1,040	1,045	99.2	In orbit: Space Electric Rocket Test. 1st orbital test of electron ion engine; radio interference experiment operated for 3 mo, one engine operated for 3,785 hrs; the other engine 2,011 hr.; considered unsuccessful
None	None	USSR	Feb 6	Tyuratam	SL-12						Kosmos mission; failed to orbit
Kosmos 323	1970 10A	USSR	Feb 10	Plesetsk	SL-3	4,730	89.4	201	314	65.4	Reentered 2/18/70
Osumi	1970 11A	Japan	Feb 11	Uchinoura	Lambda 4S-5	12	130.7	333	3,589	31.1	In orbit: 1st successful independent launch by Japan; engineering test for launching a scientific payload
None	1970 12A	USAF	Feb 11	WTR	Thor Burner II	195	101.1	759	850	98.8	In orbit
Molniya 1-13	1970 13A	USSR	Feb 19	Plesetsk	SL-6	1,750	703	461	39,170	65.3	Decayed 9/29/75: 13th in Molniya I series
Kosmos 324	1970 14A	USSR	Feb 27	Plesetsk	SL-7	325	91.9	275	466	71.0	Decayed 5/23/70
Kosmos 325	1970 15A	USSR	Mar 4	Plesetsk	SL-3	4,730	89.8	200	327	65.4	Reentered 3/12/70

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1970 16A	USAF	Mar 4	WTR	Thorad-Agena D	2,000	87.7	167	257	88.0	Decayed 3/26/70
DIAL-1-WIKA	1970 17A	Ger	Mar 10	Kourou	Diamant B	63	104.3	301	1,631	5.4	Decayed 10/5/78: 1st foreign payload launched by France; scientific capsule
MIKA	1970 17B	France	Mar 10	Kourou	Diamant B	52	104.7	313	1,665	5.4	Decayed 9/9/74: engineering capsule to measure launch vehicle performance
Kosmos 326	1970 18A	USSR	Mar 13	Plesetsk	SL-3	4,730	90.2	203	363	81.4	Reentered 3/21/70
Meteor 3	1970 19A	USSR	Mar 17	Plesetsk	SL-3	3,800	93.4	419	457	81.1	Decayed 11/18/83. Metsat to expand weather service
Kosmos 327	1970 20A	USSR	Mar 18	Plesetsk	SL-7	300	95.5	280	819	70.9	Decayed 1/19/71
NATO 1	1970 21A	NATO	Mar 20	ETR	TAT-Delta	243	1,435.2	35,718	35,818	6.0	In orbit: North Atlantic Treaty Organization's military commsat
Kosmos 328	1970 22A	USSR	Mar 27	Plesetsk	SL-4	6,300	89.7	203	299	72.9	Reentered 4/9/70
Kosmos 329	1970 23A	USSR	Apr 3	Plesetsk	SL-4	5,700	88.8	198	228	81.3	Reentered 4/15/70
Kosmos 330	1970 24A	USSR	Apr 7	Plesetsk	SL-8	875	95.2	514	543	74.1	Decayed 6/12/79
Nimbus 4	1970 25A	NASA	Apr 8	WTR	Thorad-Agena D	620	107.1	1,087	1,097	99.5	In orbit: 4th metsat; makes worldwide weather observations twice daily. Stage exploded 10/17, 300 pieces
TOPO 1	1970 25B	USA	Apr 8	WTR	Thorad-Agena D	18	106.9	1,083	1,085	99.7	In orbit: Army's SECOR-type tactical survey
Kosmos 331	1970 26A	USSR	Apr 8	Tyuratam	SL-3	4,730	89.9	206	320	65.0	Reentered 4/16/70
Vela 11	1970 27A	USAF	Apr 8	ETR	Titan IIIC	317	Current elements not maintained				In orbit: advanced nuclear detection
Vela 12	1970 27B	USAF	Apr 8	ETR	Titan IIIC	317	Current elements not maintained				In orbit: separated from Vela 11 by 180 degrees
Kosmos 332	1970 28A	USSR	Apr 11	Plesetsk	SL-8	775	99.7	737	746	74	In orbit

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Apollo 13	1970 29A	NASA	Apr 11	ETR	Saturn V	43,924	88.07	156	156	33.5	Recovered 4/17/70: failure of spacecraft oxygen tank #2 approx. 56 hrs into mission caused abort. James Lovell, Jack Swigert, Fred Haise took the crippled spacecraft around the moon, splashed down in the Pacific after 142 hrs, 53 mins
Kosmos 333	1970 30A	USSR	Apr 15	Plesetsk	SL-4	6,300	89.11	219	239	88	Reentered 4/28/70
None	1970 31A	USAF	Apr 15	WTR	Titan IIIB-Agena D	3,000	89.70	130	388	110.9	Decayed 5/6/70
Intelsat III F-7	1970 32A	CSC	Apr 23	ETR	TAT-Delta	293	1,436.2	35,772	35,805	0.2*	In orbit: 7th in series stationed at 341 deg. e long. over Atlantic
Kosmos 334	1970 33A	USSR	Apr 23	Plesetsk	SL-7	325	92.0	272	482	70.9	Decayed 8/9/70
China 1	1970 34A	PRC	Apr 24	Shuang Cheng Tzu	CZ-1	173	112.9	436	2,256	68.4	In orbit: 1st satellite launched by Peoples Republic of China
Kosmos 335	1970 35A	USSR	Apr 24	Kapustin Yar	SL-7	295	91.0	250	401	48.4	Decayed 6/22/70
Kosmos 336	1970 36A	USSR	Apr 25	Plesetsk	SL-8	50	115.4	1,462	1,484	74.0	In orbit: 1st 8-payload launch by USSR
Kosmos 337	1970 36B	USSR	Apr 25	Plesetsk	SL-8	50	116.2	1,466	1,550	74.0	In orbit
Kosmos 338	1970 36C	USSR	Apr 25	Plesetsk	SL-8	50	115.8	1,466	1,515	74.0	In orbit
Kosmos 339	1970 36D	USSR	Apr 25	Plesetsk	SL-8	50	115.0	1,443	1,468	74.0	In orbit
Kosmos 340	1970 36E	USSR	Apr 25	Plesetsk	SL-8	50	114.6	1,406	1,468	74.0	In orbit
Kosmos 341	1970 36F	USSR	Apr 25	Plesetsk	SL-8	50	113.9	1,340	1,467	74.0	In orbit
Kosmos 342	1970 36G	USSR	Apr 25	Plesetsk	SL-8	50	113.5	1,309	1,466	74.0	In orbit
Kosmos 343	1970 36H	USSR	Apr 25	Plesetsk	SL-8	50	114.2	1,373	1,466	74.0	In orbit
Meteor 4	1970 37A	USSR	Apr 28	Plesetsk	SL-3	3,800	97.3	625	710	81.2	In orbit: operational metsat
Kosmos 344	1970 38A	USSR	May 12	Plesetsk	SL-3	4,730	89.8	202	329	72.9	Reentered 5/20/70
Kosmos 345	1970 39A	USSR	May 20	Tyuratam	SL-3	4,730	89.0	192	270	51.7	Reentered 5/28/70

*Initial elements

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
None	1970 40A	USAF	May 20	WTR	Thor-Agena D	2,000	88.6	162	247	83.0	Decayed 6/17/70
Soyuz 9	1970 41A	USSR	Jun 1	Tyuratam	SL-4	6,500	88.4	176	227	51.6	Recovered 6/19/70: at the time, longest manned spaceflight (17 days, 16 hrs, 59 mins). Andrian Nikolayev, Vitali Sevastyanov aboard
Kosmos 346	1970 42A	USSR	Jun 10	Tyuratam	SL-3	4,730	89.1	197	274	51.7	Reentered 6/17/70
Kosmos 347	1970 43A	USSR	Jun 12	Kapustin Yar	SL-7	250	107.9	216	2,050	48.4	Decayed 11/7/70
Kosmos 348	1970 44A	USSR	Jun 13	Plesetsk	SL-7	357	93.1	201	651	70.9	Decayed 7/25/70
Kosmos 349	1970 45A	USSR	Jun 17	Plesetsk	SL-3	4,730	89.8	199	332	65.3	Reentered 6/25/70
None	1970 46A	USAF	Jun 19	ETR	Atlas-Agena D	700	Current elements not maintained				In orbit
Meteor 5	1970 47A	USSR	Jun 23	Plesetsk	SL-3	3,300	101.9	821	879	81.2	In orbit: operational metsat
None	1970 48A	USAF	Jun 25	WTR	Titan IIIB-Agena D	3,000	89.7	129	389	108.8	Reentered 7/6/70
Molniya 1-14	1970 49A	USSR	Jun 26	Plesetsk	SL-6	1,750	704.7	448	39,260	65.3	Decayed 2/16/76: commsat
Kosmos 350	1970 50A	USSR	Jun 26	Tyuratam	SL-4	5,700	89.0	202	258	51.7	Reentered 7/8/70
Kosmos 351	1970 51A	USSR	Jun 27	Plesetsk	SL-7	325	91.9	270	467	70.9	Decayed 10/13/70
Kosmos 352	1970 52A	USSR	Jul 7	Tyuratam	SL-3	4,730	89.4	207	294	51.7	Reentered 7/15/70
Kosmos 353	1970 53A	USSR	Jul 9	Plesetsk	SL-4	5,700	89.3	204	284	65.4	Reentered 7/21/70
None	1970 54A	USAF	Jul 23	WTR	Titan IIIB-Agena D	2,000	90.0	158	398	60.0	Decayed 8/19/70
Intelsat III F-8	1970 55A	CSC	Jul 23	ETR	TAT-Delta	270	1,043	19,400	36,030	13.3*	In orbit: failed to achieve synchronous orbit due to apogee motor malfunction; not operating
Kosmos 354	1970 56A	USSR	Jul 28	Tyuratam	SL-11	5,000	87.5	134	178	49.6	Decayed 7/28/70: possible FOBS test
Interkosmos 3	1970 57A	USSR	Aug 7	Kapustin Yar	SL-7	340	99.7	200	1,295	48.4	Decayed 12/6/70: international experiments from East European countries to study protons, electrons, and alpha particles

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 355	1970 58A	USSR	Aug 7	Plesetsk	SL-3	4,730	89.7	199	322	65.4	Reentered 8/15/70
None	None	USSR	Aug 8	Tyuratam	SL-13	—	—	—	—	—	Kosmos failure
Kosmos 356	1970 59A	USSR	Aug 10	Plesetsk	SL-7	357	92.6	231	573	81.9	Decayed 10/2/70
Venera 7	1970 60A	USSR	Aug 17	Tyuratam	SL-6	1,180	Flight time: 120 days				Decayed 12/15/70: lander capsule tx 23 mins
None	1970 61A	USAF	Aug 18	WTR	Titan IIIB-Agena D	—	89.6	151	365	110.9	Decayed 9/3/70
Skynet II	1970 62A	UK	Aug 19	ETR	TAT-Delta	243	636.5	270	36,041	28.0*	In orbit: failed to achieve usable orbit; apogee motor failure; 2nd UK military communications satellite
Kosmos 357	1970 63A	USSR	Aug 19	Plesetsk	SL-7	325	92.0	272	476	70.9	Decayed 11/24/70
Kosmos 358	1970 64A	USSR	Aug 20	Plesetsk	SL-8	875	93.9	425	431	74.0	Decayed 6/26/90
Kosmos 359	1970 65A	USSR	Aug 22	Tyuratam	SL-6	1,180	95.5	208	890	51.1	Decayed 11/6/70: possible Venus probe attempt
None	1970 66A	USAF	Aug 26	WTR	Thorad-Agena D	2,000	94.5	484	504	74.9	Decayed 3/26/75
Transit 19	1970 67A	NASA	Aug 27	WTR	Scout	18	106.8	949	1,209	90.2	In orbit: Navy navigation
Kosmos 360	1970 68A	USSR	Aug 29	Tyuratam	SL-4	6,300	89.6	209	305	64.9	Reentered 9/8/70
None	1970 69A	USAF	Sep 1	ETR	Atlas-Agena D	—	Current elements not maintained				In orbit
None	1970 70A	USAF	Sep 3	WTR	Thor-Burner II	—	101.9	764	874	99.1	Reentered 9/21/70
Kosmos 361	1970 71A	USSR	Sep 8	Plesetsk	SL-4	6,300	89.5	209	298	72.8	Reentered 9/21/70
Luna 16	1970 72A	USSR	Sep 12	Tyuratam	SL-12	5,600	—	—	—	—	Reentered 9/24/70: unmanned moon lander touched down on Sea of Fertility 9/20/70; returned lunar soil samples
Kosmos 362	1970 73A	USSR	Sep 16	Plesetsk	SL-7	300	95.5	270	829	70.9	Decayed 10/13/71
Kosmos 363	1970 74A	USSR	Sep 17	Tyuratam	SL-4	5,700	89.5	208	294	65.0	Reentered 9/29/70
Kosmos 364	1970 75A	USSR	Sep 22	Plesetsk	SL-4	6,300	89.6	202	297	65.4	Reentered 10/2/70
Kosmos 365	1970 76A	USSR	Sep 25	Tyuratam	SL-11-r	5,000	87.7	133	174	49.5	Reentered 9/25/70: possible FOBS test

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Molniya 1-15	1970 77A	USSR	Sep 29	Plesetsk	SL-6	1,750	70.6	480	39,300	65.5	Decayed 3/20/76: domestic communications
Kosmos 366	1970 78A	USSR	Oct 1	Tyuratam	SL-4	5,700	89.4	204	295	64.9	Reentered 10/13/70
Kosmos 367	1970 79A	USSR	Oct 3	Tyuratam	SL-11	4,540	104.5	921	1,018	65.3	In orbit. Rorsat
Kosmos 368	1970 80A	USSR	Oct 8	Tyuratam	SL-4	5,900	90.5	204	400	64.9	Reentered 10/14/70
Kosmos 369	1970 81A	USSR	Oct 8	Plesetsk	SL-7	325	92.3	269	506	70.9	Decayed 1/22/71
Kosmos 370	1970 82A	USSR	Oct 9	Tyuratam	SL-4	6,300	89.4	202	288	64.9	Reentered 10/22/70
Kosmos 371	1970 83A	USSR	Oct 12	Plesetsk	SL-8	775	99.6	737	741	74.0	In orbit
Interkosmos 4	1970 84A	USSR	Oct 14	Kapustin Yar	SL-7	320	93.3	255	649	43.3	Reentered 1/17/71: int'l experiments provided by Czechoslovakia, East Germany and USSR to study solar ultraviolet and X-radiation effects
Meteor 6	1970 85A	USSR	Oct 15	Plesetsk	SL-3	3,800	96.4	565	574	81.2	In orbit: operational metsat
Kosmos 372	1970 86A	USSR	Oct 16	Plesetsk	SL-8	750	100.6	773	797	74.1	In orbit
Kosmos 373	1970 87A	USSR	Oct 20	Tyuratam	SL-11	3,320	94.7	472	544	62.9	Decayed 3/8/80
Zond 8	1970 88A	USSR	Oct 20	Tyuratam	SL-12	5,375	—	—	—	—	Recovered 10/27/70: passed moon
Kosmos 374	1970 89A	USSR	Oct 23	Tyuratam	SL-11	3,320	109.9	556	1,785	63.0	ASAT warhead, 45 pieces in orbit
None	1970 90A	USAF	Oct 23	WTR	Titan IIIB-Agena D	3,000	89.8	135	396	111.0	Reentered 11/11/70
Kosmos 375	1970 91A	USSR	Oct 30	Tyuratam	SL-11	3,320	111.6	550	2,042	62.8	ASAT warhead, 31 pieces in orbit
Kosmos 376	1970 92A	USSR	Oct 30	Plesetsk	SL-4	6,300	89.4	207	286	65.3	Reentered 11/12/70
None	1970 93A	USAF	Nov 6	ETR	Titan IIIC	820	1,198.1	25,937	36,040	14.7	In orbit
OFO-1	1970 94A	NASA	Nov 9	WI	Scout	133	92.6	304	518	37.4	Recovered 5/9/71; Orbiting Frog Otolith: 6-day flight, all flight objectives met
Radiation Meteoroid	1970 94B	NASA	Nov 9	WI	Scout	46	92.6	21	322	37.4	Decayed 2/7/71
Luna 17	1970 95A	USSR	Nov 10	Tyuratam	SL-12	5,600	—	—	—	—	Landed on moon 11/17/70: unmanned moon rover
Kosmos 377	1970 96A	USSR	Nov 11	Tyuratam	SL-4	5,700	89.40	204	286	64.9	Reentered 11/23/70

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 378	1970 97A	USSR	Nov 17	Plesetsk	SL-7	710	104.8	234	1,742	74.0	Decayed 8/17/72
None	1970 98A	USAF	Nov 18	WTR	Thorad-Agena D	2,000	88.7	185	232	82.9	Decayed 12/11/70
None	1970 98B	USAF	Nov 18	WTR	Thorad-Agena D	60	94.6	487	511	83.2	Decayed 9/14/77
Kosmos 379	1970 99A	USSR	Nov 24	Tyuratam	SL-13	7,495	126.8	192	1.210	51.6	Decayed 9/21/83. Manned lunar related?
Kosmos 380	1970 100A	USSR	Nov 24	Plesetsk	SL-7	250	102.1	199	1,520	81.9	Decayed 6/17/71
Molniya 1-16	1970 101A	USSR	Nov 27	Plesetsk	SL-6	1,750	707.0	471	39,356	65.4	Decayed 11/25/75: domestic communications
OAO-B	None	NASA	Nov 30	ETR	Atlas-Centaur	2,121	—	—	—	—	Failed to orbit: launch failure
Kosmos 381	1970 102A	USSR	Dec 2	Plesetsk	SL-8	710	104.8	961	1,008	74.0	In orbit
Kosmos 382	1970 103A	USSR	Dec 2	Tyuratam	SL-13	10,380	171.0	2,464	5,189	55.9	In orbit. Manned lunar related?
Kosmos 383	1970 104A	USSR	Dec 3	Plesetsk	SL-4	6,800	89.3	204	279	65.4	Reentered 12/16/70
Kosmos 384	1970 105A	USSR	Dec 10	Plesetsk	SL-4	5,900	89.4	203	292	72.8	Reentered 12/22/70
NOAA-1	1970 106A	NASA	Dec 11	WTR	Long Tank TAT-Delta	306	114.8	1,422	1,471	101.8	In orbit: National Oceanic & Atmospheric Administration world-wide weather observation
Explorer 42	1970 107A	NASA/ Italy	Dec 12	San Marco	Scout	143	95.3	522	563	3.0	Decayed 4/5/79: Small Astronomy Satellite (SAS-1), also named Uhuru; 1st U.S. satellite launched by another country
Kosmos 385	1970 108A	USSR	Dec 12	Plesetsk	SL-8	680	104.6	974	979	74.0	In orbit
PEOLE 1	1970 109A	France	Dec 12	Kourou	Diamant B	70	98.4	517	747	15.0	Decayed 6/16/80: gathered data from a meteorological balloon system to be utilized for ECOLE
Kosmos 386	1970 110A	USSR	Dec 15	Tyuratam	SL-4	6,300	89.4	215	276	89.2	Reentered 12/28/70
Kosmos 387	1970 111A	USSR	Dec 16	Plesetsk	SL-8	875	95.3	528	538	74.0	Decayed 1/19/80
Kosmos 388	1970 112A	USSR	Dec 18	Plesetsk	SL-7	325	92.3	271	505	70.9	Decayed 5/10/71
Kosmos 389	1970 113A	USSR	Dec 18	Plesetsk	SL-3	3,800	97.8	598	679	81.2	In orbit
Molniya 1-17	1970 114A	USSR	Dec 25	Tyuratam	SL-6	1,750	711.8	495	39,565	64.9	Decayed 12/22/75: domestic communications

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 390	1971 1A	USSR	Jan 12	Tyuratam	SL-4	6,300	80.28	204	275	65.01	Reentered 1/25/71
Kosmos 391	1971 2A	USSR	Jan 14	Plesetsk	SL-7	300	95.3	256	641	70.9	Decayed 2/21/72
Meteor 7	1971 3A	USSR	Jan 20	Plesetsk	SL-3	3,800	96.8	586	603	81.2	In orbit
Kosmos 392	1971 4A	USSR	Jan 21	Tyuratam	SL-4	5,700	89.3	204	278	64.9	Reentered 2/2/71
None	1971 5A	USAF	Jan 21	WTR	Titan IIIB-Agena D	3,000	90.0	139	418	110.8	Reentered 2/9/71
Intelsat IV F-2	1971 6A	CSC	Jan 26	ETR	Atlas-Centaur	706	1,450.8	35,801	36,349	0.6*	In synchronous orbit: over Atlantic at 24.5 deg. w long.; commercial service began 3/26/71; 1st launch of 4th-generation commercial communications satellite
Kosmos 393	1971 7A	USSR	Jan 26	Plesetsk	SL-7	325	92.1	272	485	71.0	Decayed 6/16/71
Apollo 14	1971 8A	NASA	Jan 31	ETR	Saturn V	44,456	88.0	186	186	32.5	Reentered 2/9/71: Alan Shepard, Edgar Mitchell landed on moon 2/5/71 at Fra Mauro. Stuart Roosa remained in command module. Mission duration 9 days, 1 mn, 57 sec
ALSEP 14		NASA					17.46 w, 3.67 s (lunar surface)				Science Station data until 10/1/77
NATO-2	1971 9A	NATO	Feb 3	ETR	TAT-Delta	243	1,435.8	30,496	41,063	8.7	In orbit: 2nd North Atlantic Treaty Organization military communications satellite
Kosmos 394	1971 10A	USSR	Feb 9	Plesetsk	SL-11	750	96.1	550	578	65.8	In orbit
Tansei	1971 11A	Japan	Feb 16	Uchinoura	Mu-4S	62	106.1	987	1,108	29.7	In orbit: tx data for one week
None	1971 12A	USAF	Feb 17	WTR	Thor-Burner II	195	100.6	755	817	98.3	In orbit
Calsphere 3	1971 12C	USAF	Feb 17	WTR	Thor-Burner II	1	98.8	634	665	98.4	Radar calibration sphere. Decayed 10/17/89
Calsphere 4	1971 12D	USAF	Feb 17	WTR	Thor-Burner II	1	98.7	623	653	98.4	Radar calibration sphere. Decayed 9/20/89
Calsphere 5	1971 12E	USAF	Feb 17	WTR	Thor-Burner II	1	99.1	658	698	98.4	Radar calibration sphere. Decayed 1/7/90
Kosmos 395	1971 13A	USSR	Feb 17	Plesetsk	SL-8	875	95.4	529	546	74.0	Decayed 4/6/80
None	None	USAF	Feb 17	WTR	Thor-Agena	2,000	—	—	—	—	Failed to orbit
Kosmos 396	1971 14A	USSR	Feb 18	Plesetsk	SL-4	6,300	89.4	205	286	65.4	Reentered 3/3/71

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 397	1971 15A	USSR	Feb 25	Tyuratam	SL-11	3,320	113.3	561	2,197	65.7	ASAT warhead, 82 pieces in orbit
Kosmos 398	1971 16A	USSR	Feb 26	Tyuratam	SL-13	7,255	168.2	201	7,250	51.6	In orbit. Manned lunar related?
Kosmos 399	1971 17A	USSR	Mar 3	Tyuratam	SL-4	6,300	89.3	201	283	65.0	Reentered 3/17/71
China 2	1971 18A	PRC	Mar 3	Shuang Cheng Tzu	CZ-1	221	106.1	268	1,830	69.9	Decayed 6/17/79: 2nd launch by PRC
Explorer 43 (IMP 1)	1971 19A	NASA	Mar 13	ETR	Long Tank Thor-Delta	288	5628	353	204,577	28.7	Decayed 10/2/74: 9th in Interplanetary Monitoring Platform series; studied earth's magnetosphere
Kosmos 400	1971 20A	USSR	Mar 18	Plesetsk	SL-11	750	104.9	981	1,001	65.8	In orbit
None	1971 21A	USAF	Mar 21	WTR	Titan IIIB-Agena D	700	Current elements not maintained				In orbit
None	1971 22A	USAF	Mar 24	WTR	Long Tank Thorad-Agena D	2,000	88.5	157	246	81.5	Decayed 4/12/71
Kosmos 401	1971 23A	USSR	Mar 27	Plesetsk	SL-4	6,300	89.2	185	290	72.8	Reentered 4/9/71
ISIS 2	1971 24A	Can	Apr 1	WTR	Thor-Delta	264	113.5	1,354	1,423	88.2	In orbit: 3rd in a series of international ionospheric studiess
Kosmos 402	1971 25A	USSR	Apr 1	Tyuratam	SL-8	4,540	104.9	948	1,030	65.0	In orbit
Kosmos 403	1971 26A	USSR	Apr 2	Plesetsk	SL-4	5,700	88.9	214	230	81.3	Reentered 4/14/71
Kosmos 404	1971 27A	USSR	Apr 4	Tyuratam	SL-11	3,320	94.2	802	1,010	65.1	Decayed 4/4/71
Kosmos 405	1971 28A	USSR	Apr 7	Plesetsk	SL-3	3,800	97.7	637	641	81.2	In orbit
Kosmos 406	1971 29A	USSR	Apr 14	Plesetsk	SL-4	6,300	89.1	217	246	81.2	Reentered 4/24/71
Tournesol 1	1971 30A	France	Apr 15	Kourou	Diamant B	96	96.1	457	697	46.3	Decayed 1/28/80
Meteor 8	1971 31A	USSR	Apr 17	Plesetsk	SL-3	3,800	95.8	512	540	81.2	Metsat. Decayed 1/10/91
Salyut 1	1971 32A	USSR	Apr 19	Tyuratam	SL-13	18,500	88.5	200	210	51.5	Reentered 10/11/71: prototype manned space station
None	1971 33A	USAF	Apr 22	WTR	Titan IIIB-Agena D	3,000	89.8	132	401	110.9	Reentered 5/13/71

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Soyuz 10	1971 34A	USSR	Apr 23	Tyuratam	SL-4	6,575	89.2	209	258	51.6	Recovered 4/24/71: Vladimir Shatalov, Alexei Yeliseyev, Nikolai Rukavishnikov docked with Salyut 1, 4/24. Failed to board. Flight time: 1 day, 23 h, 46 mn.
Kosmos 407	1971 35A	USSR	Apr 23	Plesetsk	SL-8	750	100.8	780	809	74.0	In orbit
San Marco 3	1971 36A	Italy	Apr 24	San Marco	Scout	164	93.8	222	718	3.2	Decayed 11/29/71: 3rd Italian atmospheric satellite
Kosmos 408	1971 37A	USSR	Apr 24	Plesetsk	SL-7	250	102.0	200	1,514	81.8	Decayed 12/29/71
Kosmos 409	1971 38A	USSR	Apr 28	Plesetsk	SL-8	600	109.3	1,175	1,209	74.0	In orbit
None	1971 39A	USAF	May 5	ETR	Titan IIIC	820	Current elements not maintained				In orbit
Kosmos 410	1971 40A	USSR	May 6	Tyuratam	SL-4	5,900	89.3	205	280	64.9	Reentered 5/18/71
Kosmos 411	1971 41A	USSR	May 7	Plesetsk	SL-8	50	113.8	1,314	1,489	74.0	In orbit
Kosmos 412	1971 41B	USSR	May 7	Plesetsk	SL-8	50	116.1	1,477	1,534	74.0	In orbit
Kosmos 413	1971 41C	USSR	May 7	Plesetsk	SL-8	50	115.7	1,472	1,506	74.0	In orbit
Kosmos 414	1971 41D	USSR	May 7	Plesetsk	SL-8	50	115.1	1,426	1,491	74.0	In orbit
Kosmos 415	1971 41E	USSR	May 7	Plesetsk	SL-8	50	115.4	1,449	1,498	74.0	In orbit
Kosmos 416	1971 41F	USSR	May 7	Plesetsk	SL-8	50	114.4	1,369	1,490	74.0	In orbit
Kosmos 417	1971 41G	USSR	May 7	Plesetsk	SL-8	50	114.1	1,341	1,490	74.0	In orbit
Kosmos 418	1971 41H	USSR	May 7	Plesetsk	SL-8	50	114.8	1,398	1,490	74.0	In orbit
Mariner H	None	USAF	May 8	ETR	Atlas-Centaur	996	—	—	—	—	Failed to achieve orbit: 2nd stage failure
Kosmos 419	1971 42A	USSR	May 10	Tyuratam	SL-12	4,650	87.4	145	159	51.5	Decayed 5/12/71. Mars probe failure
Kosmos 420	1971 43A	USSR	May 18	Tyuratam	SL-4	6,300	89.0	199	257	51.7	Reentered 5/29/71
Kosmos 421	1971 44A	USSR	May 19	Plesetsk	SL-7	325	91.8	273	469	70.9	Decayed 11/8/71
Mars 2	1971 45A	USSR	May 19	Tyuratam	SL-12	4,650		—	—	—	1st Soviet Mars landing 11/27/71
Kosmos 422	1971 46A	USSR	May 22	Plesetsk	SL-8	680	105.0	982	1,005	74.0	In orbit
Kosmos 423	1971 47A	USSR	May 27	Plesetsk	SL-7	325	92.1	272	487	71.0	Decayed 11/26/71
Kosmos 424	1971 48A	USSR	May 28	Plesetsk	SL-4	6,300	89.3	204	282	65.4	Reentered 6/10/71

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Mars 3	1971 49A	USSR	May 28	Tyuratam	SL-12	4,643	—	—	—	—	Mars probe, landed 12/2
Kosmos 425	1971 50A	USSR	May 29	Plesetsk	SL-8	820	95.2	506	553	74.0	Decayed 1/15/80
Mariner 9	1971 51A	NASA	May 30	ETR	Atlas-Centaur	974		Areocentric orbit			Mars probe, 11/13 orbit
Kosmos 426	1971 52A	USSR	Jun 4	Plesetsk	SL-8	680	104.2	376	1,547	74.0	In orbit
Soyuz 11	1971 53A	USSR	Jun 6	Tyuratam	SL-4	6,790	88.4	189	209	51.5	Reentered 6/29/71: Georgi Dobrovolsky, Vladislav Volkov, Viktor Patsayev died of asphixiation upon reentry; docked with Salyut 1 6/7 to 6/29, transferred crew. Flight time: 23 days, 18 hr., 22 mn.
None	1971 54A	USAF	Jun 8	WTR	Thor-Burner II	260	90.5	545	581	90.2	Decayed 1/31/82
Kosmos 427	1971 55A	USSR	Jun 11	Plesetsk	SL-4	6,300	89.7	204	314	72.8	Reentered 6/23/71
None	1971 56A	USAF	Jun 15	WTR	Titan IIID	13,300	114.3	184	300	96.4	Decayed 8/6/71: 1st known launch of Titan IIID
Kosmos 428	1971 57A	USSR	Jun 24	Tyuratam	SL-6	5,900	89.0	206	257	51.7	Decayed 7/6/71
Explorer 44 (Solrad 10)	1971 58A	USN/ NASA	Jul 8	WI	Scout	118	95.2	433	632	51.0	Decayed 12/15/79: 3rd in solar radiation series, measuring solar electromagnetic and stellar radiation
Meteor 9	1971 59A	USSR	Jul 16	Plesetsk	SL-3	3,800	96.0	538	554	81.2	Metsat. Decayed 8/27/91
None	1971 60A	USAF	Jul 16	WTR	Thorad-Agena D	2,000	94.5	488	508	75.0	Decayed 8/31/78
Kosmos 429	1971 61A	USSR	Jul 20	Tyuratam	SL-4	6,300	88.9	202	252	51.7	Reentered 8/2/71
Kosmos 430	1971 62A	USSR	Jul 23	Plesetsk	SL-4	6,300	89.5	199	305	65.4	Reentered 8/5/71
Apollo 15	1971 63A	NASA	Jul 26	ETR	Saturn V	46,723	87.7	169	173	32.5	Recovered 8/7/71: David Scott, James Irwin landed on moon, 7/30 at Hadley Rille near Appenine Range. Alfred Worden remained aboard command module. Mission duration 12 days, 7 hrs, 12 mn
ALSEP 15								3.66 e, 26.11 n (lunar surface)			Science station data until 10/1/77
P&F Subsatellite	1971 63D	NASA	Aug 4	Apollo 15		36		Selenocentric Orbit			1st Subsatellite launched from a manned spacecraft in space. Data until 7/72

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	None	USSR	Jul 27	Tyuratam	SL-15						Lunar program. 1st stage failure
Molniya 1-18	1971 64A	USSR	Jul 28	Plesetsk	SL-6	1,750	704.9	468	39,254	65.3	Decayed 7/19/77: domestic communications
Kosmos 431	1971 65A	USSR	Jul 30	Tyuratam	SL-4	5,700	88.9	194	257	51.7	Reentered 8/11/71
Kosmos 432	1971 66A	USSR	Aug 5	Tyuratam	SL-4	6,300	88.9	941	259	51.7	Reentered 8/18/71
OV1 20	1971 67A	USA	Aug 7	WTR	Atlas F	70	106.2	133	1,957	92.0	Decayed 8/28/71
OV1 21	1971 67B	USA	Aug 7	WTR	Atlas F	70	101.8	779	908	87.6	In orbit
Cannonball 2	1971 67C	USA	Aug 7	WTR	Atlas F	364	106.1	133	1,970	92.0	Decayed 1/31/72
Rigid Sphere 2	1971 67E	USA	Aug 7	WTR	Atlas F	37	101.5	771	881	87.6	In orbit
Balloon (Mylar)	1971 67F	USA	Aug 7	WTR	Atlas F	.8	102.0	777	914	87.6	Decayed 6/11/72
Grid Sphere 2	1971 67G	USA	Aug 7	WTR	Atlas F	4	102.0	783	915	87.6	Decayed 4/14/79
Grid Sphere 1	1971 67H	USA	Aug 7	WTR	Atlas F	6.2	101.8	777	920	87.6	Decayed 11/2/79
Rigid Sphere 1	1971 67P	USA	Aug 7	WTR	Atlas F	1.6	98.3	786	917	87.6	Decayed 9/1/81
Kosmos 433	1971 68A	USSR	Aug 8	Tyuratam	SL-11	—	98.3	122	299	49.4	Decayed 8/10/71
Kosmos 434	1971 69A	USSR	Aug 12	Tyuratam	SL-4	7,000	112.9	188	11,804	51.5	Decayed 8/12/81. Manned lunar related?
None	1971 70A	USAF	Aug 12	WTR	Titan IIIB-Agena D	3,000	90.1	137	424	111.0	Reentered 9/3/71
EOLE 1	1971 71A	France	Aug 16	WI	Scout	84	100.3	664	870	50.1	In orbit: experimental atmospheric weather; returned data for 5 months
Kosmos	None	USSR	Aug 19	Plesetsk	SL-4						Failed to orbit
Kosmos 435	1971 72A	USSR	Aug 27	Plesetsk	SL-7	325	92.0	271	482	70.9	Decayed 1/28/72
Luna 18	1971 73A	USSR	Sep 2	Tyuratam	SL-12	5,600	—	—	—	—	Crashed on moon 9/11/71 after 54 orbits. Flight time 8.85 days
Kosmos 436	1971 74A	USSR	Sep 7	Plesetsk	SL-8	875	95.0	509	545	74.0	Decayed 1/4/80
Kosmos 437	1971 75A	USSR	Sep 10	Plesetsk	SL-8	875	95.3	519	548	74.0	Decayed 3/29/80
None	1971 76A	USAF	Sep 10	WTR	LTTAT-Agena D	2,000	88.4	156	244	74.9	Decayed 10/5/71

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1971 76B	USAF	Sep 10	WTR	LTTAT-Agena D	60	94.6	492	507	75.1	Decayed 2/3/76
Kosmos 438	1971 77A	USSR	Sep 14	Plesetsk	SL-4	6,300	89.5	208	296	65.4	Reentered 9/27/71
Kosmos 439	1971 78A	USSR	Sep 21	Plesetsk	SL-4	5,700	89.4	207	284	65.4	Reentered 10/2/71
Kosmos 440	1971 79A	USSR	Sep 24	Plesetsk	SL-7	300	95.2	272	785	71.0	Decayed 10/29/72
Shinsei	1971 80A	Japan	Sep 28	Kagoshima	Mu 4S	65	113.1	872	1,870	32.1	In orbit: Japanese scientific satellite
Kosmos 441	1971 81A	USSR	Sep 28	Tyuratam	SL-4	6,300	89.2	204	268	65.2	Reentered 10/10/71
Luna 19	1971 82A	USSR	Sep 28	Tyuratam	SL-12	5,600		Selenocentric orbit			Lunar photography mission
OSO 7	1971 83A	NASA	Sep 29	ETR	LTTAD	635	93.4	323	571	33.1	Decayed 7/9/74: solar science
TETR-D	1971 83B	NASA	Sep 29	ETR	LTTAD	20	94.1	398	572	33.0	Decayed 9/21/78: test and training for Apollo communications
Kosmos 442	1971 84A	USSR	Sep 29	Plesetsk	SL-4	6,300	89.4	182	313	72.8	Reentered 10/12/71
Kosmos 443	1971 85A	USSR	Oct 7	Plesetsk	SL-4	5,900	89.5	204	301	65.4	Reentered 10/19/71
Kosmos 444	1971 86A	USSR	Oct 13	Plesetsk	SL-8	50	114.1	1,319	1,507	74.0	In orbit
Kosmos 445	1971 86B	USSR	Oct 13	Plesetsk	SL-8	50	114.4	1,347	1,510	74.0	In orbit
Kosmos 446	1971 86C	USSR	Oct 13	Plesetsk	SL-8	50	114.8	1,378	1,510	74.0	In orbit
Kosmos 447	1971 86D	USSR	Oct 13	Plesetsk	SL-8	50	115.1	1,408	1,513	74.0	In orbit
Kosmos 448	1971 86E	USSR	Oct 13	Plesetsk	SL-8	50	115.5	1,438	1,515	74.0	In orbit
Kosmos 449	1971 86F	USSR	Oct 13	Plesetsk	SL-8	50	116.2	1,481	1,539	74.0	In orbit
Kosmos 450	1971 86G	USSR	Oct 13	Plesetsk	SL-8	50	115.9	1,460	1,527	74.0	In orbit
Kosmos 451	1971 86H	USSR	Oct 13	Plesetsk	SL-8	50	116.6	1,487	1,571	74.0	In orbit
None	1971 87A	USAF	Oct 14	WTR	Thor-Burner II	195	101.4	782	865	99.1	In orbit
Kosmos 452	1971 88A	USSR	Oct 14	Tyuratam	SL-4	6,300	89.0	198	260	64.9	Reentered 10/27/71
STP	1971 89A	USAF	Oct 17	WTR	Thorad-Agena D	1,500	100.2	748	780	92.7	In orbit: USAF advanced space technology experiments Space Test Program (former SESP)
Kosmos 453	1971 90A	USSR	Oct 19	Plesetsk	SL-7	325	92.1	271	493	71.00	Decayed 3/19/72

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
NOAA 2 (ITOS B)	1971 91A	NASA	Oct 21	WTR	Delta N	308	102.5	279	1,474	102.6	2nd stage decayed 7/21/72: satellite failed to achieve orbit
None	1971 92A	USAF	Oct 23	WTR	Titan IIIB-Agena D	3,000	90.0	134	416	110.94	Reentered 11/17/71
Prospero	1971 93A	UK	Oct 28	Woomera	Black Arrow	66	105.6	537	1,482	82.1	In orbit
Kosmos 454	1971 94A	USSR	Nov 2	Plesetsk	SL-4	6,300	89.1	203	262	65.4	Reentered 11/16/71
DSCS II-A1	1971 95A	USAF	Nov 3	ETR	Titan IIIC	520	1,436.3	35,773	35,806	5.3	In orbit: 2nd generation military Defense Satellite Communications System
DSCS II-A2	1971 95B	USAF	Nov 3	ETR	Titan IIIC	520	1,435.7	35,280	36,275	5.2	In orbit: 2nd generation military Defense Satellite Communications System
Explorer 45	1971 96A	NASA	Nov 15	San Marco	Scout	52	325.1	272	18,149	3.6	In orbit: 2nd US launch by Italian crew; examined energetic particles and studied earth's magnetosphere
Kosmos 455	1971 97A	USSR	Nov 17	Plesetsk	SL-7	325	92.1	272	491	70.9	Decayed 4/9/72
Kosmos 456	1971 98A	USSR	Nov 19	Plesetsk	SL-4	6,300	89.1	178	304	72.8	Reentered 12/2/71
Kosmos 457	1971 99A	USSR	Nov 20	Plesetsk	SL-8	600	109.4	1,181	1,216	74.0	In orbit
Molniya 2	1971 100A	USSR	Nov 24	Plesetsk	SL-6	1,800	712.0	517	39,554	65.4	Decayed 5/10/76: 1st launch of Molniya 2 series
Kosmos 458	1971 101A	USSR	Nov 29	Plesetsk	SL-7	325	92.2	272	497	70.0	Decayed 4/20/72
Kosmos 459	1971 102A	USSR	Nov 29	Plesetsk	SL-11	750	89.4	224	260	65.0	Decayed 12/27/71
Kosmos 460	1971 103A	USSR	Nov 30	Plesetsk	SL-8	875	95.2	528	532	74.0	Decayed 3/5/80
Interkosmos 5	1971 104A	USSR	Dec 2	Kapustin Yar	SL-7	340	98.5	198	1,181	48.5	Decayed 4/7/72: USSR and Czechoslovakian instruments to study effects of solar activity on near-earth radiation
Kosmos 461	1971 105A	USSR	Dec 2	Plesetsk	SL-8	680	94.61	486	511	69.23	Decayed 2/21/79
Kosmos 462	1971 106A	USSR	Dec 3	Tyuratam	SL-11	3,320	105.43	230	1,800	65.75	ASAT warhead, 29 pieces
None	None	USAF	Dec 4	ETR	Atlas-Agena D	700	—	—	—	—	Failed to orbit: 1st stage booster malfunction
Diamant B-4 (D-2A polar)	None	France	Dec 5	Kourou	Diamant B	97	—	—	—	—	Launch failure of Diamant B 2nd stage

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 463	1971 107A	USSR	Dec 6	Tyuratam	SL-4	6,300	89.24	202	273	64.97	Reentered 12/11/71
Kosmos 464	1971 108A	USSR	Dec 10	Plesetsk	SL-4	6,300	90.34	206	375	72.75	Reentered 12/16/71
Ariel 4 (UK-4)	1971 109A	UK	Dec 11	WTR	Scout	99.5	95.35	477	593	82.99	Decayed 12/12/78: 4th in coop program (NASA/UK); 4 British and 1 American experiment to survey the ionosphere and certain radio signals for 1 year
None	1971 110A	USAF	Dec 14	WTR	Thorad-Agena D	700	Elements not available				In orbit with 3 subsatellites
Kosmos 465	1971 111A	USSR	Dec 15	Plesetsk	SL-8	680	104.8	965	1,005	74.0	In orbit
Kosmos 466	1971 112A	USSR	Dec 16	Tyuratam	SL-4	6,300	89.4	209	280	65	Reentered 12/27/71
Kosmos 467	1971 113A	USSR	Dec 17	Plesetsk	SL-7	325	92.0	267	472	71	Decayed 4/18/72
Kosmos 468	1971 114A	USSR	Dec 17	Plesetsk	SL-8	750	100.6	776	798	74	In orbit
Molniya 1-19	1971 115A	USSR	Dec 19	Plesetsk	SL-6	1,750	703	499	39,139	65.5	Decayed 4/13/77
Intelsat IV F-3	1971 116A	CSC	Dec 20	ETR	Atlas-Centaur	1,410	1,454.6	35,649	36,645	3.9	In orbit: over Atlantic, 2nd in Intelsat IV series
Kosmos 469	1971 117A	USSR	Dec 25	Tyuratam	SL-4	4,540	104.7	929	1,028	64.5	In orbit
Kosmos 470	1971 118A	USSR	Dec 27	Plesetsk	SL-4	5,900	89.1	194	260	65.40	Reentered 1/6/72
Oreol (Aureole)	1971 119A	France-USSR	Dec 27	Plesetsk	SL-8	630	112.2	391	2,184	74.0	In orbit: studied upper atmosphere in high latitudes and the polar lights; 1st user satellite launched by USSR with French assistance
Meteor 10	1971 120A	USSR	Dec 29	Plesetsk	SL-3	3,300	102.5	835	922	81.3	In orbit
Kosmos 471	1972 1A	USSR	Jan 12	Tyuratam	SL-4	6,300	89.5	201	316	65	Reentered 1/25/72
None	1972 2A	USAF	Jan 20	WTR	Titan IIID	13,300	89.4	157	331	97	Reentered 2/29/72
None	1972 2D	USAF	Jan 20	WTR	Titan IIID	60	94.9	472	549	96.6	Decayed 4/7/79
Intelsat IV F-4	1972 3A	CSC	Jan 23	ETR	Atlas-Centaur	1,410	1,442.6	35,897	35,931	4.3	In orbit: stationed above Gilbert Islands in central Pacific; 3rd in Intelsat IV series
Kosmos 472	1972 4A	USSR	Jan 25	Plesetsk	SL-7	250	102.2	194	1,536	82	Decayed 8/18/72
HEOS A2	1972 5A	ESRO	Jan 31	WTR	Delta	123	7,477.1	405	240,164	90.2	Decayed 8/2/74: particles and fields

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 473	1972 6A	USSR	Feb 3	Tyuratam	SL-4	5,700	89.7	209	333	65	Reentered 2/15/72
Luna 20	1972 7A	USSR	Feb 14	Tyuratam	SL-12	5,600	Lunar Trajectory				Recovered 2/25/72: returned lunar soil sample
None		US	Feb 16	WTR	Titan IIIB-Agena D	3,000					Failure
Kosmos 474	1972 8A	USSR	Feb 16	Tyuratam	SL-4	6,300	88.9	207	347	65	Reentered 2/29/72
Kosmos 475	1972 9A	USSR	Feb 25	Plesetsk	SL-8	680	104.7	963	996	74	In orbit
None	1972 10A	USAF	Mar 1	ETR	Titan IIIC	820	Current elements not maintained				In orbit
Kosmos 476	1972 11A	USSR	Mar 1	Plesetsk	SL-3	3,800	95.5	539	550	81.2	Decayed 10/25/91
Pioneer 10	1972 12A	NASA	Mar 3	ETR	Atlas-Centaur	259	Solar system escape				In orbit: Jupiter encounter 12/73: 1st earth-made object to escape the solar system 6/13/83
Kosmos 477	1972 13A	USSR	Mar 4	Plesetsk	SL-4	5,900	89.6	212	328	72.9	Reentered 3/16/72
TD-1A	1972 14A	ESRO	Mar 12	WTR	Delta	472	95	531	539	97.5	Decayed 1/9/80: investigated high-energy emissions
Kosmos 478	1972 15A	USSR	Mar 15	Plesetsk	SL-4	6,300	89.5	213	319	65.4	Reentered 3/28/72
None	1972 16A	USAF	Mar 17	WTR	Titan IIIB-Agena	3,000	89.9	131	409	110.9	Decayed 4/11/72
Kosmos 479	1972 17A	USSR	Mar 22	Plesetsk	SL-8	875	95.2	514	514	74	Decayed 4/13/80
None	1972 18A	USAF	Mar 24	WTR	Thor Burner II	195	101.5	787	868	99.1	In orbit
Kosmos 480	1972 19A	USSR	Mar 25	Plesetsk	SL-8	600	109.1	1,170	1,197	83	In orbit
Kosmos 481	1972 20A	USSR	Mar 25	Plesetsk	SL-7	375	92.4	269	514	71	Decayed 9/2/72
Venera 8	1972 21A	USSR	Mar 27	Tyuratam	SL-6	1,180	Venus trajectory				Landed Venus 7/22/72, transmitted surface data
Meteor 11	1972 22A	USSR	Mar 30	Plesetsk	SL-3	3,300	102.4	858	883	81.2	In orbit: Metsat
Kosmos 482	1972 23A	USSR	Mar 31	Tyuratam	SL-6	1,180	105.8	189	1,869	52	Decayed 5/5/81: probable Venus failure
Kosmos 483	1972 24A	USSR	Apr 3	Plesetsk	SL-4	6,300	89.8	212	345	72.9	Reentered 4/15/72
Molniya 1-20	1972 25A	USSR	Apr 4	Plesetsk	SL-6	1,000	705.3	480	39,260	65.6	Decayed 1/30/74
SRET 1	1972 25B	France	Apr 4	Plesetsk	—	15	704.7	458	39,250	65.6	Decayed 2/26/74: French test payload

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Kosmos 484	1972 26A	USSR	Apr 6	Plesetsk	SL-4	5,900	88.8	203	236	81.3	Reentered 4/18/72
Interkosmos 6	1972 27A	USSR	Apr 7	Tyuratam	SL-4	6,000	89	203	256	51.8	Recovered 4/11/72: scientific
Kosmos 485	1972 28A	USSR	Apr 11	Plesetsk	SL-7	325	92.1	280	506	71	Decayed 8/30/72
Prognoz 1	1972 29A	USSR	Apr 14	Tyuratam	SL-6	845	5,820	950	200,000	65*	In orbit: scientific
Kosmos 486	1972 30A	USSR	Apr 14	Plesetsk	SL-4	6,300	89.1	214	267	81.4	Reentered 4/27/72
Apollo 16	1972 31A	NASA	Apr 16	ETR	Saturn V	46,733	—	—	—	—	Recovered 4/27/72: John Young, Charles Duke landed at Descartes. Thomas Mattingly flew longest solo flight to date in command module, performing EVA on return trip. Mission duration 11 days, 1 hr, 51 mn
ALSEP 16							16.0 e, 9.0 s (lunar surface)				Science station data until 10/1/77
P&F Subsatellite	1972 31D	NASA	Apr 24	Apollo 16	—	36	—	—	—	—	Impacted moon 5/29/72
None	1972 32A	USAF	Apr 19	WTR	Thorad-Agena	2,000	88.8	155	277	81.5	Decayed 5/12/72
Kosmos 487	1972 33A	USSR	Apr 21	Plesetsk	SL-7	325	92.3	278	531	71	Decayed 9/24/72
Kosmos 488	1972 34A	USSR	May 5	Plesetsk	SL-4	6,300	89.5	211	319	65.4	Reentered 5/18/72
Kosmos 489	1972 35A	USSR	May 6	Plesetsk	SL-8	680	104.7	962	999	74	In orbit
Kosmos 490	1972 36A	USSR	May 17	Plesetsk	SL-4	5,900	89.4	212	310	65.4	Reentered 5/29/72
Molniya 2-2	1972 37A	USSR	May 19	Plesetsk	SL-6	1,800	705	460	39,300	65.5	Decayed 3/22/77
None	None	US	May 20	WTR	Titan IIIB-Agena	3,000					Failure
Kosmos 491	1972 38A	USSR	May 25	Tyuratam	SL-4	6,300	89.5	210	303	65	Reentered 6/8/72
None	1972 39A	USAF	May 25	WTR	Thorad-Agena	2,000	89.1	158	305	96.3	Decayed 6/4/72
Kosmos 492	1972 40A	USSR	Jun 9	Tyuratam	SL-4	6,300	89.8	209	342	65	Reentered 6/22/72
Intelsat IV F-5	1972 41A	CSC	Jun 13	ETR	Atlas-Centaur	1,410	1,438.6	35,821	35,849	5.4	In orbit: stationed over Indian Ocean, 4th in Intelsat IV series

*Initial elements, current elements unknown

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 493	1972 42A	USSR	Jun 21	Tyuratam	SL-4	5,700	89.5	213	308	65	Reentered 7/3/72
Kosmos 494	1972 43A	USSR	Jun 23	Plesetsk	SL-8	750	100.6	780	794	74.1	In orbit
Kosmos 495	1972 44A	USSR	Jun 23	Plesetsk	SL-4	6,300	89.3	206	298	65.4	Reentered 7/6/72
Kosmos 496	1972 45A	USSR	Jun 26	Tyuratam	SL-4	6,570	89.6	195	342	51.6	Reentered 7/2/72
Prognoz 2	1972 46A	USSR	Jun 29	Tyuratam	SL-6	845	5,820	550	200,000	65*	Decayed 12/15/82: scientific
Interkosmos 7	1972 47A	USSR	Jun 30	Kapustin Yar	SL-7	375	92.6	260	555	48.4	Decayed 10/5/72: scientific
Kosmos 497	1972 48A	USSR	Jun 30	Plesetsk	SL-7	300	95.2	271	788	70.9	Decayed 11/7/73
Meteor 12	1972 49A	USSR	Jun 30	Plesetsk	SL-3	3,300	102.8	880	898	81.2	In orbit: Metsat
Kosmos 498	1972 50A	USSR	Jul 5	Plesetsk	SL-7	325	92.1	282	511	71	Decayed 11/25/72
Kosmos 499	1972 51A	USSR	Jul 6	Tyuratam	SL-4	6,300	89.2	209	283	51.8	Reentered 7/17/72
None	1972 52A	USAF	Jul 7	WTR	Titan IIID	13,300	88.7	174	251	96.8	Decayed 9/13/72
None	1972 52C	USAF	Jul 7	WTR	Titan IIID	60	94.6	497	504	96.1	Decayed 5/6/78
Kosmos 500	1972 53A	USSR	Jul 10	Plesetsk	SL-8	875	95.2	509	554	74	Decayed 3/29/80
Kosmos 501	1972 54A	USSR	Jul 12	Kapustin Yar	SL-7	250	109.2	221	2,168	48.5	Decayed 5/9/74
Kosmos 502	1972 55A	USSR	Jul 13	Plesetsk	SL-4	5,900	89.2	206	284	65.4	Reentered 7/25/72
Kosmos 503	1972 56A	USSR	Jul 19	Plesetsk	SL-4	6,300	89.4	208	304	65.4	Reentered 8/1/72
Kosmos 504	1972 57A	USSR	Jul 20	Plesetsk	SL-8	50	113.9	1,319	1,494	74	In orbit
Kosmos 505	1972 57B	USSR	Jul 20	Plesetsk	SL-8	50	114.3	1,349	1,495	74	In orbit
Kosmos 506	1972 57C	USSR	Jul 20	Plesetsk	SL-8	50	114.6	1,379	1,495	74	In orbit
Kosmos 507	1972 57D	USSR	Jul 20	Plesetsk	SL-8	50	114.9	1,410	1,494	74	In orbit
Kosmos 508	1972 57E	USSR	Jul 20	Plesetsk	SL-8	50	115.3	1,441	1,494	74	In orbit
Kosmos 509	1972 57F	USSR	Jul 20	Plesetsk	SL-8	50	115.6	1,472	1,496	74	In orbit
Kosmos 510	1972 57G	USSR	Jul 20	Plesetsk	SL-8	50	116.0	1,493	1,508	74	In orbit
Kosmos 511	1972 57H	USSR	Jul 20	Plesetsk	SL-8	50	116.4	1,493	1,544	74	In orbit

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
ERTS-1	1972 58A	NASA	Jul 23	WTR	Delta	816.4	103.1	899	911	98.8	In orbit: Earth Resources Technology Satellite, 1st to return repetitive synoptic images and data on earth's resources
Kosmos 512	1972 59A	USSR	Jul 28	Plesetsk	SL-4	5,700	89.3	207	294	65.4	Reentered 8/9/72
Salyut		USSR	Jul 29	Tyuratam	SL-13	18,000					Failed to orbit
Kosmos 513	1972 60A	USSR	Aug 2	Tyuratam	SL-4	6,300	89.8	209	340	65	Reentered 8/15/72
Explorer 46	1972 61A	NASA	Aug 13	WI	Scout	136	97.6	492	811	37.7	Decayed 11/2/79: meteoroid technology
Kosmos 514	1972 62A	USSR	Aug 16	Plesetsk	SL-8	680	104.3	954	966	83	In orbit
Kosmos 515	1972 63A	USSR	Aug 18	Plesetsk	SL-4	6,300	89.3	203	300	72.9	Reentered 8/31/72
Denpa	1972 64A	Japan	Aug 19	Kagoshima	Mu 4S	75	154.6	232	6,093	31.0	Decayed 5/19/80: investigated ionospheric phenomena
OAO3 (Copernicus)	1972 65A	NASA	Aug 21	ETR	Atlas-Centaur	2,204	99.5	729	739	35	In orbit: large observatory for stellar radiation in the UV region
Kosmos 516	1972 66A	USSR	Aug 21	Tyuratam	SL-11	4,540	104.5	906	1,039	64.8	In orbit
Kosmos 517	1972 67A	USSR	Aug 30	Tyuratam	SL-4	5,700	89.4	207	305	65	Reentered 9/11/72
None	1972 68A	USAF	Sep 1	WTR	Titan IIIB-Agena	3,000	89.7	140	380	110.5	Reentered 9/30/72
Triad OI-1	1972 69A	USAF	Sep 2	WTR	Scout	94	100.3	728	818	90	In orbit. 1st experimental stationkeeping Transit navigation satellite
Kosmos 518	1972 70A	USSR	Sep 15	Plesetsk	SL-4	5,900	89.6	208	330	72.9	Reentered 9/24/72
Kosmos 519	1972 71A	USSR	Sep 16	Tyuratam	SL-4	6,300	89.8	210	343	71.3	Reentered 9/26/72
Kosmos 520	1972 72A	USSR	Sep 19	Plesetsk	SL-6	1,800	715.1	5,250	34,971	67.6	In orbit
Explorer 47	1972 73A	NASA	Sep 23	ETR	Delta	376	17,670	201,100	235,600	17.2*	In orbit: to investigate cislunar radiation, interplanetary magnetic field, and earth's magnetosphere
Kosmos 521	1972 74A	USSR	Sep 29	Plesetsk	SL-8	750	104.9	989	992	65.8	In orbit
Molniya 2-3	1972 75A	USSR	Sep 30	Plesetsk	SL-6	1,800	703	392	39,240	65.6	Decayed 1/12/78: communications satellite

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1972 76A	USAF	Oct 2	WTR	Atlas F-Burner II	208	98.8	684	699	98.7	In orbit
None	1972 76B	USAF	Oct 2	WTR	Atlas F-Burner II	726	99.1	708	725	98.6	In orbit
Kosmos 522	1972 77A	USSR	Oct 4	Plesetsk	SL-4	6,300	89.8	214	342	72.9	Reentered 10/17/72
Kosmos 523	1972 78A	USSR	Oct 5	Plesetsk	SL-7	325	92	272	481	71.0	Decayed 3/7/73
None	1972 79A	USAF	Oct 10	WTR	Titan IIID	13,300	88.8	158	271	96.5	Reentered 1/8/73
None	1972 79C	USAF	Oct 10	WTR	Titan IIID	60	114.8	1,423	1,469	95.6	In orbit
Kosmos 524	1972 80A	USSR	Oct 11	Plesetsk	SL-7	325	92.3	267	512	71.0	Decayed 3/25/73
Molniya 1-21	1972 81A	USSR	Oct 14	Plesetsk	SL-6	1,750	705	480	39,300	65.3	Decayed 11/1/77
NOAA-2	1972 82A	NASA	Oct 15	WTR	Delta	344	114.9	1,447	1,453	101.6	In orbit: operational metsat
Oscar 6	1972 82B	NASA	Oct 15	WTR	Delta	16	114.9	1,447	1,453	101.7	In orbit: amateur radio
Kosmos 525	1972 83A	USSR	Oct 18	Plesetsk	SL-4	5,900	89.3	208	292	65.4	Reentered 10/29/72
Kosmos 526	1972 84A	USSR	Oct 25	Plesetsk	SL-7	325	92	282	511	71.0	Decayed 4/8/73
Meteor 13	1972 85A	USSR	Oct 26	Plesetsk	SL-3	3,300	102.4	858	883	81.2	In orbit: metsat
Kosmos 527	1972 86A	USSR	Oct 31	Plesetsk	SL-4	6,300	89.7	214	330	65.4	Reentered 11/13/72
Kosmos 528	1972 87A	USSR	Nov 1	Plesetsk	SL-8	50	114.1	1,364	1,465	74.0	In orbit
Kosmos 529	1972 87B	USSR	Nov 1	Plesetsk	SL-8	50	114.5	1,401	1,465	74.0	In orbit
Kosmos 530	1972 87C	USSR	Nov 1	Plesetsk	SL-8	50	113.8	1,331	1,466	74.0	In orbit
Kosmos 531	1972 87D	USSR	Nov 1	Plesetsk	SL-8	50	114.7	1,419	1,467	74.0	In orbit
Kosmos 532	1972 87E	USSR	Nov 1	Plesetsk	SL-8	50	113.4	1,297	1,466	74.0	In orbit
Kosmos 533	1972 87F	USSR	Nov 1	Plesetsk	SL-8	50	113.6	1,314	1,466	74.0	In orbit
Kosmos 534	1972 87G	USSR	Nov 1	Plesetsk	SL-8	50	113.9	1,347	1,466	74.0	In orbit
Kosmos 535	1972 87H	USSR	Nov 1	Plesetsk	SL-8	50	114.3	1,382	1,466	74.0	In orbit
Kosmos 536	1972 88A	USSR	Nov 3	Plesetsk	SL-8	50	95.2	518	544	74.0	Decayed 7/20/80

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1972 89A	USAF	Nov 9	WTR	Thor-Burner II	195	101.4	797	855	98.8	In orbit
Anik 1	1972 90A	Can	Nov 10	ETR	Delta	557	1457.5	36,150	36,257	1.2	In orbit: 1st Canadian communications satellite
Explorer 48 (SAS B)	1972 91A	NASA	Nov 15	San Marco	Scout	185	95.4	443	632	1.9	Decayed 5/1/79: small astronomy satellite
ESRO IV	1972 92A	ESRO	Nov 22	WTR	Scout	114	99	245	7,087	91.1	Decayed 4/15/74: investigation of polar ionosphere
None	None	USSR	Nov 23	Tyuratam	SL-15						Final attempt to launch Saturn-class booster; failed
Kosmos 537	1972 93A	USSR	Nov 25	Tyuratam	SL-4	5,900	89.6	207	324	65.0	Reentered 12/7/72
Interkosmos 8	1972 94A	USSR	Nov 30	Plesetsk	SL-7	340	93.2	214	679	71.0	Decayed 3/2/73: scientific
Molniya 1-22	1972 95A	USSR	Dec 2	Tyuratam	SL-6	1,750	703	500	39,100	65.0	Decayed 2/11/76: communications satellite
Apollo 17	1972 96A	NASA	Dec 7	ETR	Saturn V	46,743	88.7	169	178	32.5	Recovered 12/19/72: Eugene Cernan, Harrison Schmitt landed at Taurus Littrow. Ronald Evans remained aboard command module. Mission duration 12 days, 13 hrs, 52 mins
ALSEP 17							30.75 e, 20.17 n (lunar surface)				Science station data until 10/1/77
Nimbus 5	1972 97A	NASA	Dec 11	WTR	Delta	772	107.1	1,087	1,100	99.7	In orbit: advanced metsat
Molniya 2-4	1972 98A	USSR	Dec 12	Plesetsk	SL-6	1,800	706	495	39,300	65.3	Decayed 1/22/75: communications satellite
Kosmos 538	1972 99A	USSR	Dec 14	Plesetsk	SL-4	6,300	89.4	212	305	65.4	Reentered 12/27/72
Aeros	1972 100A	FRG	Dec 16	WTR	Scout	127	95.3	223	867	96.9	Decayed 8/22/73: Federal Republic of Germany scientific
None	1972 101A	USAF	Dec 20	ETR	Atlas-Agena	700	Current elements not maintained				In orbit
Kosmos 539	1972 102A	USSR	Dec 21	Plesetsk	SL-8	600	112.9	1,340	1,377	74.0	In orbit
None	1972 103A	USAF	Dec 21	WTR	Titan IIIB-Agena	3,000	89.8	132	398	110.4	Reentered 1/23/73
Kosmos 540	1972 104A	USSR	Dec 25	Plesetsk	SL-8	750	100.6	772	798	74.1	In orbit
Kosmos 541	1972 105A	USSR	Dec 27	Plesetsk	SL-4	5,900	90.3	242	371	81.4	Reentered 1/8/73
Kosmos 542	1972 106A	USSR	Dec 28	Plesetsk	SL-3	3,800	93.9	434	496	81.2	Decayed 10/9/83

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Luna 21	1973 1A	USSR	Jan 8	Tyuratam	SL-12	4,850	Lunar trajectory				Landed on moon 1/16/73: 840-kg Lunokhod unmanned rover
Kosmos 543	1973 2A	USSR	Jan 11	Tyuratam	SL-4	4,000	89.6	203	311	65.0	Recovered 1/24/73: military reconnaissance
Kosmos 544	1973 3A	USSR	Jan 20	Plesetsk	SL-8	750	95.1	510	541	74.0	Decayed 6/15/80: probable ferret
Kosmos 545	1973 4A	USSR	Jan 24	Plesetsk	SL-7	400	92.2	269	495	71.0	Decayed 7/31/73: electronic monitor
Kosmos 546	1973 5A	USSR	Jan 26	Kapustin Yar	SL-8	750	96.3	560	598	50.7	In orbit: probable scientific
Kosmos 547	1973 6A	USSR	Feb 1	Tyuratam	SL-4	4,000	89.6	203	310	65.0	Recovered 2/13/73: military reconnaissance
Molniya 1-23	1973 7A	USSR	Feb 3	Tyuratam	SL-6	1,000	717.7	904	39,451	65.0	Decayed 10/23/77
Kosmos 548	1973 8A	USSR	Feb 8	Plesetsk	SL-4	4,000	89.6	205	300	65.4	Recovered 2/21/73: military reconnaissance
Prognoz 3	1973 9A	USSR	Feb 15	Tyuratam	SL-6	845	5,783	590	200,000	65*	In orbit: solar flare monitor
Kosmos 549	1973 10A	USSR	Feb 28	Plesetsk	SL-8	750	95.1	513	538	74.0	Decayed 6/29/80: probable ferret
Kosmos 550	1973 11A	USSR	Mar 1	Plesetsk	SL-4	4,000	89.7	206	317	65.4	Recovered 3/11/73: military reconnaissance
Kosmos 551	1973 12A	USSR	Mar 6	Tyuratam	SL-4	4,000	89.5	206	296	65.0	Recovered 3/20/73: military reconnaissance
None	1973 13A	USAF	Mar 6	ETR	Atlas-Agena D	700	Current elements not maintained				In orbit
None	1973 14A	USAF	Mar 9	WTR	Titan IIID	13,300	88.8	152	270	95.7	Decayed 5/19/73
Meteor 14	1973 15A	USSR	Mar 20	Plesetsk	SL-3	2,000	102.5	866	883	81.2	In orbit: metsat
Kosmos 552	1973 16A	USSR	Mar 22	Plesetsk	SL-4	4,000	89.7	204	312	72.8	Recovered 4/3/73: military reconnaissance
Salyut 2	1973 17A	USSR	Apr 3	Tyuratam	SL-13	18,500	89.0	207	248	51.6	Decayed 5/28/73: space station disintegrated 4/14/73
Molniya 2-5	1973 18A	USSR	Apr 5	Plesetsk	SL-6	1,250	717.7	617	39,735	65.6	Decayed 1/6/79: communications satellite
Pioneer 11	1973 19A	NASA	Apr 6	ETR	Atlas-Centaur	259	Trans-solar trajectory				In orbit: 2nd Jupiter probe; encounter 12/74; encounter Saturn 9/1/79; Departed solar system 2/23/90
Kosmos 553	1973 20A	USSR	Apr 12	Plesetsk	SL-7	400	92.2	272	494	71.0	Decayed 11/11/73: electronic monitor
Kosmos 554	1973 21A	USSR	Apr 19	Plesetsk	SL-4	4,000	89.5	194	304	72.8	Decayed 5/27/73: returnable payload exploded into 197 pieces 5/7; military reconnaissance

*Initial elements

Name	**Int'l Desig.**	**Proj. Dir.**	**Launch Data**			**Weight (kg)**	**Orbital Data**				**Status**
			Date	**Site**	**Vehicle**		**Period**	**Perigee**	**Apogee**	**Incl.**	
Interkosmos 9	1973 22A	USSR	Apr 19	Kapustin Yar	SL-7	400	102.1	199	1,526	48.4	Decayed 10/15/73: "Copernicus-500" solar radiation monitor
Anik 2	1973 23A	Can	Apr 20	ETR	Delta	272	1,442.9	35,864	35,974	4.2	In orbit: Canadian commsat
Kosmos 555	1973 24A	USSR	Apr 25	Plesetsk	SL-4	4,000	89.0	216	233	81.3	Recovered 5/7/73: military and ice reconnaissance
Kosmos	None	USSR	Apr 25	Tyuratam	SL-11						Failed to orbit. Rorsat
Kosmos 556	1973 25A	USSR	May 5	Plesetsk	SL-4	4,000	89.0	218	225	81.3	Recovered 5/14/73: military and ice reconnaissance
Kosmos 557	1973 26A	USSR	May 11	Tyuratam	SL-13	19,400	89.0	214	243	51.6	Decayed 5/22/73: Salyut failure
Skylab 1	1973 27A	NASA	May 14	ETR	Saturn V	74,783	93.2	422	442	50.0	Decayed 7/11/79: station included Orbital Workshop, Airlock Module, Multiple Docking Adapter, and Apollo Telescope Mount
None	1973 28A	USAF	May 16	WTR	Titan IIIB-Agena D	3,000	89.4	136	352	110.5	Reentered 6/13/73
Kosmos 558	1973 29A	USSR	May 17	Plesetsk	SL-7	400	92.3	269	501	71.0	Decayed 12/23/73: electronic monitor
Kosmos 559	1973 30A	USSR	May 18	Plesetsk	SL-4	4,000	89.8	204	325	65.4	Recovered 5/23/73: military reconnaisance
Kosmos 560	1973 31A	USSR	May 23	Plesetsk	SL-4	4,000	89.7	203	314	72.9	Recovered 6/5/73: military reconnaissance
Skylab 2	1973 32A	NASA	May 25	ETR	Saturn IB	19,979	93.2	422	442	50.0	Recovered 6/22/73: carried Pete Conrad, Joe Kerwin, Paul Weitz. Mission duration 28 days, 49 mn, 49 sec
Kosmos 561	1973 33A	USSR	May 25	Plesetsk	SL-4	4,000	89.5	206	295	65.4	Recovered 6/6/73: military reconnaissance
Meteor 15	1973 34A	USSR	May 29	Plesetsk	SL-3	2,000	102.3	842	891	81.2	In orbit: metsat
Kosmos 562	1973 35A	USSR	Jun 5	Plesetsk	SL-7	400	92.1	270	487	71.0	Decayed 1/7/74: electronic monitor
Kosmos 563	1973 36A	USSR	Jun 6	Plesetsk	SL-4	4,000	89.5	206	298	65.4	Recovered 6/18/73: military reconnaissance
Kosmos 564	1973 37A	USSR	Jun 8	Plesetsk	SL-8	40	114.6	1,393	1,478	74.0	In orbit: military commsat
Kosmos 565	1973 37B	USSR	Jun 8	Plesetsk	SL-8	40	115.3	1,447	1,488	74.0	In orbit: military commsat
Kosmos 566	1973 37C	USSR	Jun 8	Plesetsk	SL-8	40	115.0	1,432	1,480	74.0	In orbit: military commsat
Kosmos 567	1973 37D	USSR	Jun 8	Plesetsk	SL-8	40	114.8	1,411	1,481	74.0	In orbit: military commsat
Kosmos 568	1973 37E	USSR	Jun 8	Plesetsk	SL-8	40	114.4	1,373	1,478	74.0	In orbit: military commsat

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 569	1973 37F	USSR	Jun 8	Plesetsk	SL-8	40	114.2	1,355	1,478	74.0	In orbit: military commsat
Kosmos 570	1973 37G	USSR	Jun 8	Plesetsk	SL-8	40	113.9	1,335	1,479	74.0	In orbit: military commsat
Kosmos 571	1973 37H	USSR	Jun 8	Plesetsk	SL-8	40	113.7	1,317	1,478	74.0	In orbit: military commsat
Kosmos 572	1973 38A	USSR	Jun 10	Tyuratam	SL-4	4,000	89.3	206	281	51.7	Recovered 6/23/73: new model military reconnaissance
Explorer 49	1973 39A	NASA	Jun 10	ETR	Delta	328	Selenocentric orbit				In lunar orbit: Radio Astronomy Explorer-B measures galactic and solar radio noise
None	1973 40A	USAF	Jun 12	ETR	Titan IIIC	820	Current elements not maintained				In orbit
Kosmos 573	1973 41A	USSR	Jun 15	Tyuratam	SL-4	6,570	89.5	192	309	51.6	Recovered 6/17/73: unmanned Soyuz test flight
Kosmos 574	1973 42A	USSR	Jun 20	Plesetsk	SL-8	550	105.0	978	1,009	83.0	In orbit: navsat
Kosmos 575	1973 43A	USSR	Jun 21	Plesetsk	SL-4	4,000	89.3	204	271	64.5	Recovered 7/3/73: military reconnaissance
None	None	USAF	Jun 28	WTR	Titan IIIB-Agena D	3,000	—	—	—	—	Failed to orbit
Kosmos 576	1973 44A	USSR	Jun 27	Plesetsk	SL-4	4,000	89.9	204	332	72.9	Recovered 7/9/73: military reconnaissance
Molniya 2-6	1973 45A	USSR	Jul 11	Plesetsk	SL-6	1,250	705.1	441	39,285	65.4	Decayed 8/5/78: domestic communications
None	1973 46A	USAF	Jul 13	WTR	Titan IIID	13,300	88.8	156	269	96.2	Reentered 10/12/73
ITOS-E	None	NASA	Jul 16	WTR	Delta	345	—	—	—	—	Failed to orbit: 2nd stage malfunction; Improved Tiros Operational System
Mars 4	1973 47A	USSR	Jul 21	Tyuratam	SL-12	4,650	Heliocentric orbit				Failed to achieve Mars orbit
Kosmos 577	1973 48A	USSR	Jul 25	Plesetsk	SL-4	4,000	89.4	171	313	65.4	Recovered 8/7/73: military reconnaissance
Mars 5	1973 49A	USSR	Jul 25	Tyuratam	SL-12	4,650	Areocentric orbit				In orbit: Mars orbiter
Skylab 3	1973 50A	NASA	Jul 28	ETR	Saturn 1B	20,121	93.2	422	442	50.0	Recovered 9/25/73: carried Alan Bean, Owen Garriott, Jack Lousma. Mission duration 59 days, 11 hrs, 9 mn, 4 sec
Kosmos 578	1973 51A	USSR	Aug 1	Plesetsk	SL-4	4,000	89.4	200	292	65.4	Recovered 8/13/73: military reconnaissance
Mars 6	1973 52A	USSR	Aug 5	Tyuratam	SL-12	4,650	Heliocentric orbit				In orbit: Mars lander. Failed
Mars 7	1973 53A	USSR	Aug 9	Tyuratam	SL-12	4,650	Heliocentric orbit				In orbit: Mars Flyby, lander missed

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1973 54A	USAF	Aug 17	WTR	Thor-Burner II	195	101.2	795	839	98.5	In orbit
Kosmos 579	1973 55A	USSR	Aug 21	Plesetsk	SL-4	4,000	89.3	196	282	65.4	Recovered 9/3/73: military reconnaissance
None	1973 56A	USAF	Aug 21	WTR	Titan IIIB-Agena D	700	Current elements not maintained				In orbit
Kosmos 580	1973 57A	USSR	Aug 22	Plesetsk	SL-7	400	92.2	273	493	71.0	Decayed 4/1/74: electronic monitor
Intelsat IV F-7	1973 58A	CSC	Aug 23	ETR	Atlas-Centaur	1,410	1,460.0	35,905	36,601	4.4	In orbit: over Atlantic, 5th in Intelsat IV series
Kosmos 581	1973 59A	USSR	Aug 24	Tyuratam	SL-4	4,000	89.4	208	288	51.6	Recovered 9/6/73: military reconnaissance
Kosmos 582	1973 60A	USSR	Aug 28	Plesetsk	SL-8	750	95.2	519	543	74.0	Decayed 9/5/80: probable ferret
Molniya 1-24	1973 61A	USSR	Aug 30	Plesetsk	SL-6	1,000	717.8	463	39,893	65.5	Decayed 12/5/79: domestic communications
Kosmos 583	1973 62A	USSR	Aug 30	Tyuratam	SL-4	4,000	89.5	204	298	64.9	Recovered 9/12/73: military reconnaissance
Kosmos 584	1973 63A	USSR	Sep 6	Plesetsk	SL-4	4,000	90.0	205	336	72.8	Recovered 9/20/73: military reconnaissance
Kosmos 585	1973 64A	USSR	Sep 8	Plesetsk	SL-8	550	113.5	1,373	1,402	74.0	In orbit: navsat
Kosmos 586	1973 65A	USSR	Sep 14	Plesetsk	SL-8	550	104.7	961	1,003	82.9	In orbit: navsat
None	None	PRC	Sep 18	Shuang Cheng Tzu	CZ-2						Failed to orbit
Kosmos 587	1973 66A	USSR	Sep 21	Plesetsk	SL-4	4,000	89.6	205	300	65.4	Recovered 10/4/73: military reconnaissance
Soyuz 12	1973 67A	USSR	Sep 27	Tyuratam	SL-4	6,570	88.5	171	229	51.6	Recovered 9/29/73: carried Vasili Lazarev, Oleg Makarov. Maiden flight of new Salyut ferry. Flight time: 1 day, 23 hr, 16 mn.
None	1973 68A	USAF	Sep 27	WTR	Titan IIIB-Agena D	3,000	89.7	131	385	110.5	Reentered 10/28/73
Kosmos 588	1973 69A	USSR	Oct 2	Plesetsk	SL-8	40	115.3	1,446	1,491	74.0	In orbit: military commsat
Kosmos 589	1973 69B	USSR	Oct 2	Plesetsk	SL-8	40	114.9	1,412	1,487	74.0	In orbit: military commsat
Kosmos 590	1973 69C	USSR	Oct 2	Plesetsk	SL-8	40	115.1	1,431	1,485	74.0	In orbit: military commsat
Kosmos 591	1973 69D	USSR	Oct 2	Plesetsk	SL-8	40	114.1	1,344	1,485	74.0	In orbit: military commsat
Kosmos 592	1973 69E	USSR	Oct 2	Plesetsk	SL-8	40	113.9	1,328	1,483	74.0	In orbit: military commsat

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 593	1973 69F	USSR	Oct 2	Plesetsk	SL-8	40	114.3	1,361	1,484	74.0	In orbit: military commsat
Kosmos 594	1973 69G	USSR	Oct 2	Plesetsk	SL-8	40	114.5	1,378	1,484	74.0	In orbit: military commsat
Kosmos 595	1973 69H	USSR	Oct 2	Plesetsk	SL-8	40	114.7	1,396	1,484	74.0	In orbit: military commsat
Kosmos 596	1973 70A	USSR	Oct 3	Plesetsk	SL-4	4,000	89.4	206	287	65.4	Recovered 10/9/73: military reconnaissance
Kosmos 597	1973 71A	USSR	Oct 6	Plesetsk	SL-4	4,000	89.5	206	290	65.4	Recovered 10/12/73: military reconnaissance
Kosmos 598	1973 72A	USSR	Oct 10	Plesetsk	SL-4	4,000	89.9	205	332	72.8	Recovered 10/16/73: military reconnaissance
Kosmos 599	1973 73A	USSR	Oct 15	Tyuratam	SL-4	4,000	89.3	202	280	64.9	Recovered 10/28/73: military reconnaissance
Kosmos 600	1973 74A	USSR	Oct 16	Plesetsk	SL-4	4,000	90.0	205	340	72.8	Recovered 10/23/73: military reconnaissance
Kosmos 601	1973 75A	USSR	Oct 16	Plesetsk	SL-7	400	102.3	200	1,531	81.9	Decayed 8/15/74: electronic monitor
Molniya 2-7	1973 76A	USSR	Oct 19	Plesetsk	SL-6	1,250	732.6	754	40,328	64.8	Decayed 7/8/83: domestic communications
Kosmos 602	1973 77A	USSR	Oct 20	Plesetsk	SL-4	4,000	90.0	210	335	72.9	Recovered 10/29/73: military reconnaissance
Explorer 50	1973 78A	NASA	Oct 26	ETR	Delta	371	17,279	141,185	288,859	28.7*	In orbit: solar flare and radiation monitor
Kosmos 603	1973 79A	USSR	Oct 27	Plesetsk	SL-4	4,000	90.2	205	357	72.9	Recovered 11/9/73: military reconnaissance
Kosmos 604	1973 80A	USSR	Oct 29	Plesetsk	SL-3	2,000	95.6	542	555	81.2	In orbit: probable ferret
Transit	1973 81A	USN	Oct 30	WTR	Scout-Altair	58	105.4	889	1,134	90.1	In orbit: navsat
Interkosmos 10	1973 82A	USSR	Oct 30	Plesetsk	SL-8	550	102.1	260	1,454	74.0	Decayed 7/1/77: scientific research in cooperation with Czechoslovakia and the German Democratic Republic
Kosmos 605	1973 83A	USSR	Oct 31	Plesetsk	SL-4	5,500	90.7	213	403	62.8	Recovered 11/22/73: animal flight test of manned spaceflight systems
Kosmos 606	1973 84A	USSR	Nov 2	Plesetsk	SL-6	1,250	717.1	3,599	36,721	67.5	In orbit: probable early warning military
Mariner 10	1973 85A	NASA	Nov 3	ETR	Atlas-Centaur	526		Heliocentric orbit			Venus and Mercury encounter during 1974
NOAA 3	1973 86A	NASA	Nov 6	WTR	Delta	345	116.1	1,499	1,508	101.7	In orbit: ITOS-F metsat. Delta 2nd stage exploded 12/28, 168 pieces
Kosmos 607	1973 87A	USSR	Nov 10	Plesetsk	SL-4	4,000	90.0	204	341	72.8	Recovered 11/22/73: military reconnaissance
None	1973 88A	USAF	Nov 10	WTR	Titan IIID	13,300	88.8	159	271	96.9	Reentered 3/13/74

*Initial elements

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1973 88B	USAF	Nov 10	WTR	Titan IIID	60	94.5	487	505	96.3	Decayed 11/13/73
None	1973 88C	USAF	Nov 10	WTR	Titan IIID	60	114.6	1,418	1,458	96.9	Decayed 12/26/78
Molniya 1-25	1973 89A	USSR	Nov 14	Tyuratam	SL-6	1,000	702.2	421	39,165	64.9	Decayed 5/26/79: domestic communications
Skylab 4	1973 90A	NASA	Nov 16	ETR	Saturn 1B	20,847	93.2	422	442	50.0	Recovered 2/8/74: carried Jerry Carr, Ed Gibson, and Bill Pogue. Longest U.S. space mission 84 days, 1 hr, 15 mn, 31 sec
Kosmos 608	1973 91A	USSR	Nov 20	Plesetsk	SL-7	400	92.3	270	503	71.0	Decayed 7/10/74: electronic monitor
Kosmos 609	1973 92A	USSR	Nov 21	Tyuratam	SL-4	4,000	90.1	241	314	70.0	Recovered 12/4/73: military reconnaissance
Kosmos 610	1973 93A	USSR	Nov 27	Plesetsk	SL-8	750	95.3	515	546	74.0	Decayed 9/15/80: probable ferret
Kosmos 611	1973 94A	USSR	Nov 28	Plesetsk	SL-7	4,000	92.1	270	481	71.0	Decayed 6/19/74: electronic monitor
Kosmos 612	1973 95A	USSR	Nov 28	Plesetsk	SL-4	4,000	90.0	206	346	72.8	Recovered 12/11/73: military reconnaissance
Kosmos 613	1973 96A	USSR	Nov 30	Tyuratam	SL-4	6,570	89.0	188	273	51.6	Reentered 1/29/74: unmanned Soyuz test flight
Molniya 1-26	1973 97A	USSR	Nov 30	Plesetsk	SL-6	1,000	717.8	1,370	38,985	64.1	Decayed 6/9/85: domestic communications
Kosmos 614	1973 98A	USSR	Dec 4	Plesetsk	SL-8	750	100.4	760	796	74.1	In orbit: probable military test
Kosmos 615	1973 99A	USSR	Dec 13	Plesetsk	SL-7	400	95.6	270	834	71.0	Decayed 12/17/75: electronic monitor
DSCS-II B3	1973 100A	USAF	Dec 14	ETR	Titan IIIC	566	1437.2	35,801	35,816	2.8	In orbit: military commsat stationed above 13 deg. w long.
DSCS-II B4	1973 100B	USAF	Dec 14	ETR	Titan IIIC	566	1,437.7	35,803	35,830	2.8	In orbit: military commsat stationed above 175 deg. e long.
Explorer 51	1973 101A	NASA	Dec 16	WTR	Delta	658	132.4	155	4,297	68.1	Decayed 12/12/78: Atmosphere Explorer-C, upper atmosphere monitor
Kosmos 616	1973 102A	USSR	Dec 17	Plesetsk	SL-4	4,000	89.8	205	330	72.9	Recovered 12/28/73: military reconnaissance
Soyuz 13	1973 103A	USSR	Dec 18	Tyuratam	SL-4	6,570	89.3	222	254	51.6	Recovered 12/26/73: carried Pyotr Klimuk, Valentin Lebedev. 1st time U.S. (Skylab)/USSR in space at once. They did not meet. Mission duration 7 days, 20 hrs, 55 mn

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 617	1973 104A	USSR	Dec 19	Plesetsk	SL-8	40	113.9	1,332	1,482	74.0	In orbit: military commsat
Kosmos 618	1973 104B	USSR	Dec 19	Plesetsk	SL-8	40	115.2	1,442	1,484	74.0	In orbit: military commsat
Kosmos 619	1973 104C	USSR	Dec 19	Plesetsk	SL-8	40	115.0	1,423	1,485	74.0	In orbit: military commsat
Kosmos 620	1973 104D	USSR	Dec 19	Plesetsk	SL-8	40	115.4	1,457	1,491	74.0	In orbit: military commsat
Kosmos 621	1973 104E	USSR	Dec 19	Plesetsk	SL-8	40	114.7	1,405	1,482	74.0	In orbit: military commsat
Kosmos 622	1973 104F	USSR	Dec 19	Plesetsk	SL-8	40	114.3	1,367	1,483	74.0	In orbit: military commsat
Kosmos 623	1973 104G	USSR	Dec 19	Plesetsk	SL-8	40	114.5	1,385	1,483	74.0	In orbit: military commsat
Kosmos 624	1973 104H	USSR	Dec 19	Plesetsk	SL-8	40	114.1	1,349	1,483	74.0	In orbit: military commsat
Kosmos 625	1973 105A	USSR	Dec 21	Plesetsk	SL-4	4,000	89.7	194	330	72.8	Reentered 1/3/74: military reconnaissance
Molniya 2-8	1973 106A	USSR	Dec 25	Plesetsk	SL-6	1,250	717.8	1,272	39,083	64.1	Decayed 11/24/84: domestic communications
Oreol 2	1973 107A	Fran/ USSR	Dec 26	Plesetsk	SL-8	550	106.0	393	1,691	74.0	In orbit: French scientific payload
Kosmos 626	1973 108A	USSR	Dec 27	Tyuratam	SL-11	4,000	104.0	906	984	65.4	In orbit: military maneuverable nonrecoverable
Kosmos 627	1973 109A	USSR	Dec 29	Plesetsk	SL-8	550	104.9	966	1,015	83.0	In orbit: navigation
Kosmos 628	1974 1A	USSR	Jan 17	Plesetsk	SL-8	—	104.7	952	1,010	83.0	In orbit: navigation
Skynet 2A	1974 2A	UK	Jan 19	ETR	Thorad Delta	129	121.48	96	3,406	37.6	Decayed 1/25/74: military commsat
Kosmos 629	1974 3A	USSR	Jan 24	Plesetsk	SL-4	4,000	89.3	197	289	62.8	Reentered 2/5/74: reconnaissance
Kosmos 630	1974 4A	USSR	Jan 30	Plesetsk	SL-4	4,000	90	203	367	72.9	Reentered 2/13/74: reconnaissance
Kosmos 631	1974 5A	USSR	Feb 6	Plesetsk	SL-8	875	95.2	516	543	74.0	Decayed 10/3/80: electronic ferret
Viking Test		US	Feb 11	ETR	Titan IIIE-Centaur	3,610	—	—	—	—	Failure: 1st use of Titan/Centaur
Kosmos 632	1974 6A	USSR	Feb 12	Tyuratam	SL-4	4,000	89.4	184	333	65	Reentered 2/26/74: reconnaissance
None	1974 7A	USAF	Feb 13	WTR	Titan IIIB Agena	3,000	89.9	132	404	110.4	Reentered 3/17/74: reconnaissance
Tansei 2	1974 8A	Japan	Feb 16	Uchinoura	Mu 3C	65	121.6	284	3,233	31.2	Decayed 1/22/83

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
San Marco-4	1974 9A	Italy	Feb 18	San Marco	Scout	164	94.5	237	749	2.9	Decayed 5/4/76: scientific
Kosmos 633	1974 10A	USSR	Feb 27	Plesetsk	SL-7	400	92.1	271	491	0.9	Decayed 10/4/74: military monitoring
Meteor 16	1974 11A	USSR	Mar 5	Plesetsk	SL-3	2,200	102.0	825	885	81.2	In orbit: weather
Kosmos 634	1974 12A	USSR	Mar 5	Plesetsk	SL-7	400	92.1	269	489	70.9	Decayed 10/9/74: military monitoring mission
UK-X4 (Miranda)	1974 13A	UK	Mar 9	WTR	Scout	93	100.8	690	898	97.9	In orbit: scientific
Kosmos 635	1974 14A	USSR	Mar 14	Plesetsk	SL-4	4,000	89.8	212	350	72.9	Reentered 3/26/74: reconnaissance
None	1974 15A	USAF	Mar 16	WTR	Thor-Burner IIA	195	101.2	767	859	99.0	In orbit: weather
Kosmos 636	1974 16A	USSR	Mar 20	Tyuratam	SL-4	4,000	90.0	164	385	65.0	Reentered 4/3/74: reconnaissance
Kosmos 637	1974 17A	USSR	Mar 26	Tyuratam	SL-12	2,000	1,427.1	35,380	35,838	7.2	In orbit: 1st Soviet synchronous orbit
Kosmos 638	1974 18A	USSR	Apr 3	Tyuratam	—	6,570	89.4	195	325	51.8	Reentered 4/13/74: unmanned Soyuz
Kosmos 639	1974 19A	USSR	Apr 4	Plesetsk	SL-4	4,000	89.0	209	238	81.3	Reentered 4/15/74: reconnaissaance ice survey
None	1974 20A	USAF	Apr 10	WTR	Titan IIID	13,300	94.52	153	285	88.91	Decayed 7/28/74
None	1974 20B	USAF	Apr 10	WTR	Titan IIID	60	Elements not available				In orbit: apparent electronic ferret
None	1974 20C	USAF	Apr 10	WTR	Titan IIID	60	94.0	503	531	94.01	Decayed 2/22/80: apparent electronic ferret
Kosmos 640	1974 21A	USSR	Apr 11	Plesetsk	SL-4	4,000	88.9	205	236	81.3	Reentered 4/23/74: reconnaissance ice survey
Westar-1	1974 22A	US	Apr 13	ETR	Thorad Delta	500	1,441.0	31,512	40,252	1.7	In orbit: 1st U.S. domestic communications
Molniya 1-27	1974 23A	USSR	Apr 20	Plesetsk	SL-6	1,000	717.8	775	39,578	64.7	Decayed 11/17/85: domestic communications
Kosmos 641	1974 24A	USSR	Apr 23	Plesetsk	SL-8	40	114.5	1,385	1,480	74.0	In orbit: military communications
Kosmos 642	1974 24B	USSR	Apr 23	Plesetsk	SL-8	40	113.7	1,318	1,478	74.0	In orbit: military communications
Kosmos 643	1974 24C	USSR	Apr 23	Plesetsk	SL-8	40	114.1	1,350	1,479	74.0	In orbit: military communications
Kosmos 644	1974 24D	USSR	Apr 23	Plesetsk	SL-8	40	113.9	1,333	1,480	74.0	In orbit: military communications
Kosmos 645	1974 24E	USSR	Apr 23	Plesetsk	SL-8	40	114.3	1,366	1,481	74.0	In orbit: military communications
Kosmos 646	1974 24F	USSR	Apr 23	Plesetsk	SL-8	40	114.7	1,401	1,483	74.0	In orbit: military communications
Kosmos 647	1974 24G	USSR	Apr 23	Plesetsk	SL-8	40	114.9	1,420	1,482	74.0	In orbit: military communications

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 648	1974 24H	USSR	Apr 23	Plesetsk	SL-8	40	115.1	1,435	1,488	74.0	In orbit: military communications
Meteor 17	1974 25A	USSR	Apr 24	Plesetsk	SL-3	2,200	102.4	855	887	81.2	In orbit: weather satellite
Molniya 2-9	1974 26A	USSR	Apr 26	Plesetsk	SL-6	1,250	717.9	1,468	38,892	63.2	In orbit: domestic communications
Kosmos 649	1974 27A	USSR	Apr 29	Plesetsk	SL-4	4,000	89.3	189	320	62.8	Reentered 5/11/74: reconnaissance
Kosmos 650	1974 28A	USSR	Apr 29	Plesetsk	SL-8	600	113.4	1,365	1,399	74.0	In orbit: navigation or geodetic
Kosmos 651	1974 29A	USSR	May 15	Tyuratam	SL-11	4,540	103.4	897	940	65.0	In orbit: ocean surveillance
Kosmos 652	1974 30A	USSR	May 15	Tyuratam	SL-4	4,000	89.6	180	362	51.8	Reentered 5/23/74: reconnaissance
Kosmos 653	1974 31A	USSR	May 15	Plesetsk	SL-4	4,000	89.3	196	309	62.8	Reentered 5/27/74: reconnaissance
Kosmos 654	1974 32A	USSR	May 17	Tyuratam	SL-11	4,540	104.4	910	1,022	65.0	In orbit: ocean surveillance
SMS-1	1974 33A	NASA/ US	May 17	ETR	Thorad Delta	243	2,266.7	50,781	50,781	5.6	In orbit: 1st Synchronous Meteorological Satellite
Interkosmos 11	1974 34A	USSR	May 17	Kapustin Yar	SL-8	400	94.5	483	591	50.6	Decayed 9/6/79: scientific
Kosmos 655	1974 35A	USSR	May 21	Plesetsk	SL-8	875	95.2	521	540	74.0	Decayed 11/19/80: ferret
Kosmos 656	1974 36A	USSR	May 27	Tyuratam	SL-4	6,570	90.1	195	364	51.6	Reentered 5/29/74. unmanned Soyuz
Luna 22	1974 37A	USSR	May 29	Tyuratam	SL-12	4,000		Selenocentric orbit			In orbit: lunar probe
Kosmos 657	1974 38A	USSR	May 30	Plesetsk	SL-4	4,000	89.2	182	317	62.8	Reentered 6/13/74: reconnaissance
ATS-6	1974 39A	NASA	May 30	ETR	Titan IIIC	930	1,412.1	35,191	35,438	8.0	In orbit: applications technology
Explorer 52 (Hawkeye)	1974 40A	NASA	Jun 3	WTR	Scout	27	3,077.7	2,145	125,274	89.9	Decayed 4/28/78: solar wind research
Kosmos 658	1974 41A	USSR	Jun 6	Tyuratam	SL-4	4,000	89.4	204	286	64.9	Reentered 6/18/74: reconnaissance
None	1974 42A	USAF	Jun 6	WTR	Titan IIIB-Agena	3,000	89.9	123	412	110.5	Reentered 7/23/74: reconnaissance
Kosmos 659	1974 43A	USSR	Jun 13	Plesetsk	SL-4	4,000	89.7	190	360	62.8	Reentered 6/26/74: reconnaissance
Kosmos 660	1974 44A	USSR	Jun 18	Plesetsk	SL-8	650	107.2	388	1,805	83.0	In orbit: military monitoring
Kosmos 661	1974 45A	USSR	Jun 21	Plesetsk	SL-8	875	95.1	512	542	74.0	Decayed 8/27/80: ferret

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Salyut 3	1974 46A	USSR	Jun 24	Tyuratam	SL-13	18,500	89.4	232	257	51.5	Reentered 1/24/75: space station. Capsule ejected 9/27/74
Kosmos 662	1974 47A	USSR	Jun 26	Plesetsk	SL-7	400	94.4	267	717	70.8	Decayed 8/28/76: military monitoring
Kosmos 663	1974 48A	USSR	Jun 27	Plesetsk	SL-8	680	104.7	964	999	83.0	In orbit: navigation
Kosmos 664	1974 49A	USSR	Jun 29	Plesetsk	SL-4	4,000	89.9	205	341	72.8	Reentered 7/11/74: reconnaissance
Kosmos 665	1974 50A	USSR	Jun 29	Plesetsk	SL-6	1,250	717.9	1,484	38,874	66.4	Early warning. Decayed 7/6/90
Soyuz 14	1974 51A	USSR	Jul 3	Tyuratam	SL-4	6,570	89.9	265	270	51.6	Reentered 7/19/74: transported Pavel Popovich, Yuri Artyukhin to Salyut 3. Mission duration 15 days, 17 hrs, 30 mn
Meteor 18	1974 52A	USSR	Jul 9	Plesetsk	SL-3	2,200	103.0	887	911	81.2	In orbit: weather
Kosmos 666	1974 53A	USSR	Jul 12	Plesetsk	SL-4	4,000	89.6	191	351	62.8	Reentered 7/25/74: reconnaissance
Timation 3	1974 54A	USN	Jul 14	WTR	Atlas F	293	468.7	13,464	13,756	124.7	In orbit: navigation technology
None		PRC	Jul 14	Shuang Cheng Tzu	FB-1						Failed
Aeros 2	1974 55A	FRG	Jul 16	WTR	Scout	127	95.6	224	869	97.4	Decayed 9/25/75: upper atmosphere research
Molniya 2-10	1974 56A	USSR	Jul 23	Plesetsk	SL-6	1,250	717.6	1,530	39,815	63.6	In orbit: domestic communications
Kosmos 667	1974 57A	USSR	Jul 25	Tyuratam	SL-4	4,000	89.5	182	342	65.0	Reentered 8/7/74: reconnaissance
Kosmos 668	1974 58A	USSR	Jul 25	Plesetsk	SL-7	400	90.4	242	350	70.9	Decayed 2/21/75: military monitoring
Kosmos 669	1974 59A	USSR	Jul 26	Plesetsk	SL-4	4,000	88.9	210	244	81.3	Reentered 8/8/74: reconnaissance
Molniya 1-S	1974 60A	USSR	Jul 29	Tyuratam	SL-12	1,750	1,665.8	33,930	44.412	4.8	In orbit: domestic communications
Kosmos 670	1974 61A	USSR	Aug 6	Tyuratam	SL-4	6,700	89.5	217	307	50.6	Reentered 8/9/74: possible unmanned Soyuz
Kosmos 671	1974 62A	USSR	Aug 7	Plesetsk	SL-4	4,000	89.7	191	369	62.8	Reentered 8/20/74: reconnaissance
None	1974 63A	USAF	Aug 9	WTR	Thor-Burner IIA	195	101.5	792	862	98.7	In orbit: weather
Kosmos 672	1974 64A	USSR	Aug 12	Tyuratam	SL-4	6,570	88.5	195	221	51.7	Reentered 8/18/74: ASTP precursor

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1974 65A	USAF	Aug 14	WTR	Titan IIIB-Agena	3,000	89.89	135	402	110.5	Reentered 9/29/74: reconnaissance
Kosmos 673	1974 66A	USSR	Aug 16	Plesetsk	SL-3	3,800	95.4	530	544	81.2	Ferret. Decayed 6/1/91
Soyuz 15	1974 67A	USSR	Aug 26	Tyuratam	SL-4	6,570	88.5	173	236	51.6	Returned 8/28/74: carried Lev Demin, Gennadi Sarafanov to Salyut 3. New style ferry did not rendezvous in time, crew returned after 2 days, 12 mn
Kosmos 674	1974 68A	USSR	Aug 29	Tyuratam	SL-4	4,000	89.5	182	343	65	Reentered 9/7/74: reconnaissance
Kosmos 675	1974 69A	USSR	Aug 29	Plesetsk	SL-8	600	113.6	1,362	1,421	74.1	In orbit: navigation or geodetic
ANS	1974 70A	Neth	Aug 30	WTR	Scout	129	99.1	258	1,173	98.0	Decayed 6/14/77: Astronomical Netherlands Satellite achieved lower altitude than intended, but obtained useful data
Kosmos 676	1974 71A	USSR	Sep 11	Plesetsk	SL-8	750	100.8	786	807	74.0	In orbit: navigation or ferret or military communications
Kosmos 677	1974 72A	USSR	Sep 19	Plesetsk	SL-8	40	114.4	1,396	1,464	74.0	In orbit: military communications
Kosmos 678	1974 72B	USSR	Sep 19	Plesetsk	SL-8	40	115.9	1,464	1,531	74.0	In orbit: military communications
Kosmos 679	1974 72C	USSR	Sep 19	Plesetsk	SL-8	40	115.7	1,464	1,509	74.0	In orbit: military communications
Kosmos 680	1974 72D	USSR	Sep 19	Plesetsk	SL-8	40	115.5	1,464	1,490	74.0	In orbit: military communications
Kosmos 681	1974 72E	USSR	Sep 19	Plesetsk	SL-8	40	115.3	1,463	1,471	74.0	In orbit: military communications
Kosmos 682	1974 72F	USSR	Sep 19	Plesetsk	SL-8	40	115.1	1,451	1,464	74.0	In orbit: military communications
Kosmos 683	1974 72G	USSR	Sep 19	Plesetsk	SL-8	40	114.9	1,433	1,464	74.0	In orbit: military communications
Kosmos 684	1974 72H	USSR	Sep 19	Plesetsk	SL-8	40	114.7	1,414	1,464	74.0	In orbit: military communications
Kosmos 685	1974 73A	USSR	Sep 20	Tyuratam	SL-4	4,000	89.4	208	303	65.0	Reentered 10/2/74: reconnaissance
Kosmos 686	1974 74A	USSR	Sep 26	Plesetsk	SL-7	400	91.2	256	418	70.9	Decayed 5/1/75: military monitoring
Westar 2	1974 75A	US	Oct 10	ETR	Thorad Delta	500	1,442.3	35,898	35,916	3.3	In orbit: 2nd U.S. domestic communications
Kosmos 687	1974 76A	USSR	Oct 11	Plesetsk	SL-8	400	94.2	286	698	74.0	Decayed 2/5/78: military monitoring
Ariel 5	1974 77A	UK	Oct 15	San Marco	Scout	129	95.3	513	557	2.9	Decayed 3/14/80: X-ray observatory
Kosmos 688	1974 78A	USSR	Oct 18	Plesetsk	SL-4	4,000	89.8	179	349	62.8	Reentered 10/30/74: reconnaissance

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 689	1974 79A	USSR	Oct 18	Plesetsk	SL-8	680	105.0	970	1,015	82.9	In orbit: navigation
Kosmos 690	1974 80A	USSR	Oct 22	Plesetsk	SL-4	5,500	90.4	223	389	62.8	Reentered 11/12/74: bio. research
Molniya 1-28	1974 81A	USSR	Oct 24	Plesetsk	SL-6	1,000	717.7	1,850	35,800	64.7	Decayed 12/29/85. domestic communications
Kosmos 691	1974 82A	USSR	Oct 25	Tyuratam	SL-4	4,000	89.5	180	352	65	Reentered 11/6/74: reconnaissance
Meteor 19	1974 83A	USSR	Oct 28	Plesetsk	SL-3	2,200	102.3	834	899	81.2	In orbit: weather
Luna 23	1974 84A	USSR	Oct 28	Tyuratam	SL-12	5,600	Trans-lunar trajectory				Crashed on moon 11/6/74: lunar probe failure
None	1974 85A	USAF	Oct 29	WTR	Titan IIID	13,300	88.86	162	271	96.69	Reentered 3/19/75
Interkosmos 12	1974 86A	USSR	Oct 31	Plesetsk	SL-8	400	94.1	243	707	74.0	Decayed 7/11/75: atmosphere/ionospherc research
Kosmos 692	1974 87A	USSR	Nov 1	Plesetsk	SL-4	4,000	89.4	201	315	62.8	Reentered 11/13/74: reconnaissance
Kosmos 693	1974 88A	USSR	Nov 4	Plesetsk	SL-4	4,000	89.1	215	271	81.3	Reentered 11/16/74: reconnaissance
None		PRC	Nov 5	Shuang Cheng Tzu	CZ-2						Failed to orbit
NOAA-4	1974 89A	NOAA/ US	Nov 15	WTR	Thorad Delta	340	114.9	1,443	1,457	101.4	In orbit: weather. Delta 2nd stage exploded 8/20/75, 131 pieces in orbit
Amsat-Oscar 7	1974 89B	US	Nov 15	WTR	Thorad Delta	29	114.8	1,438	1,457	101.4	In orbit: for ham operators (piggy back to NOAA)
Intasat	1974 89C	Spain	Nov 15	WTR	Thorad Delta	20	114.9	1,440	1,457	101.4	In orbit: Spain's 1st satellite (piggy back to NOAA)
Kosmos 694	1974 90A	USSR	Nov 16	Plesetsk	SL-4	4,000	89.8	213	344	72.9	Reentered 11/29/74: reconnaissance
Kosmos 695	1974 91A	USSR	Nov 20	Plesetsk	SL-7	400	91.6	269	445	70.9	Decayed 7/15/75: military monitoring
Molniya 3-1	1974 92A	USSR	Nov 21	Plesetsk	SL-6	1,500	717.8	1,862	38,493	64.8	Decayed 5/15/86. domestic communications
Intelsat IV F-8	1974 93A	CSC	Nov 21	ETR	Atlas-Centaur	1,410	1,443.2	35,906	35,943	3.6	In orbit: commsat
Skynet 2B	1974 94A	UK	Nov 23	ETR	Thorad Delta	129	1,436.3	35,771	35,807	7.7	In orbit: military commsat
Kosmos 696	1974 95A	USSR	Nov 27	Plesetsk	SL-4	4,000	89.7	203	320	72.9	Reentered 12/9/74: reconnaissance
Soyuz 16	1974 96A	USSR	Dec 2	Tyuratam	SL-4	6,680	89.3	194	280	51.8	Returned 12/8/74: Anatoli Filipchenko, Nikolai Rukavishnikov aboard. Test of Salyut/Apollo docking mechanism. Mission duration 5 days, 22 hrs, 24 mn

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Helios	1974 97A	Ger	Dec 10	ETR	Titan IIIE-Centaur	370	Heliocentric Orbit				In orbit: solar probe
Kosmos 697	1974 98A	USSR	Dec 13	Plesetsk	SL-4	4,000	90.2	174	394	62.8	Reentered 12/25/74: reconnaissance
Meteor 20	1974 99A	USSR	Dec 17	Plesetsk	SL-3	2,200	102.2	841	882	81.2	In orbit: weather
Kosmos 698	1974 100A	USSR	Dec 18	Plesetsk	SL-8	875	95.2	514	552	74.0	Decayed 12/9/80: ferret
Symphonie 1	1974 101A	France/Ger	Dec 19	ETR	Thorad Delta	221	1,435.0	34,871	36,658	3.6	In orbit: experimental commsat
Molniya 2-11	1974 102A	USSR	Dec 21	Plesetsk	SL-6	1,250	718.0	1,635	39,728	62.1	Commsat. Decayed 7/7/88
Kosmos 699	1974 103A	USSR	Dec 24	Tyuratam	SL-11	—	93.3	429	443	65.0	Decayed 10/16/77: ocean surveillance. Exploded, 51 pieces
Salyut 4	1974 104A	USSR	Dec 26	Tyuratam	SL-13	18,900	91.4	337	350	51.6	Reentered 2/2/77: space station
Kosmos 700	1974 105A	USSR	Dec 26	Plesetsk	SL-8	810	104.6	958	996	83.0	In orbit: navigation
Kosmos 701	1974 106A	USSR	Dec 27	Tyuratam	SL-4	4,000	89.3	170	307	71.4	Reentered 1/9/75: reconnaissance
Soyuz 17	1975 1A	USSR	Jan 10	Tyuratam	SL-4	6,570	88.8	185	249	51.6	Reentered 2/9/75: Alexei Gubarev, Georgi Grechko docked with Salyut 4. Record 29 day, 13 hr, 20 mn mission
Kosmos 702	1975 2A	USSR	Jan 17	Tyuratam	SL-4	4,000	89.7	205	313	71.3	Reentered 1/29/75: reconnaissance
Kosmos 703	1975 3A	USSR	Jan 21	Plesetsk	SL-7	400	102.1	197	1,518	81.9	Decayed 11/20/75: military monitoring
Landsat 2	1975 4A	US	Jan 22	WTR	Delta	953	103.1	901	914	98.9	In orbit: earth resources. Booster exploded 6/19, 200 pieces
Kosmos 704	1975 5A	USSR	Jan 23	Plesetsk	SL-4	4,000	89.6	205	305	72.9	Reentered 2/6/75: reconnaissance
Kosmos 705	1975 6A	USSR	Jan 28	Plesetsk	SL-7	400	92.3	271	502	71.0	Decayed 11/18/75: military monitoring
Kosmos 706	1975 7A	USSR	Jan 30	Plesetsk	SL-6	400	717.2	5,728	34,597	68.1	In orbit: military early warning
Kosmos 707	1975 8A	USSR	Feb 5	Plesetsk	SL-8	900	95.0	498	547	74.0	Decayed 9/7/80: military elint
Molniya 2-12	1975 9A	USSR	Feb 6	Plesetsk	SL-6	1,250	717.7	1,723	38,627	64.8	Decayed 7/5/85. domestic communications
Starlette	1975 10A	France	Feb 6	Kourou	Diamant B-P4	47	104.2	805	1,108	49.8	In orbit: geodetic

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
SMS 2	1975 11A	US	Feb 6	ETR	Delta	627	1,436.7	35,752	35,844	1.8	In orbit: Synchronous Meteorological Satellite
Kosmos 708	1975 12A	USSR	Feb 12	Plesetsk	SL-8	650	113.5	1,369	1,406	69.2	In orbit: navigation/geodetic
Kosmos 709	1975 13A	USSR	Feb 12	Plesetsk	SL-4	4,000	89.4	181	310	62.8	Reentered 2/25/75: reconnaissance
Intelsat IV F-6	None	CSC	Feb 20	ETR	Atlas-Centaur	1,410	—	—	—	—	Destroyed: launch vehicle malfunction
SRATS (Taiyo)	1975 14A	Japan	Feb 24	Uchinoura	Mu 3C	86	118.6	248	2,984	31.5	Decayed 6/29/80: solar radiation and thermopheric structure
Kosmos 710	1975 15A	USSR	Feb 26	Tyuratam	SL-4	4,000	89.6	176	335	65.0	Reentered 3/12/75: reconnaissance
Kosmos 711	1975 16A	USSR	Feb 28	Plesetsk	SL-8	40	115.4	1,460	1,490	74.0	In orbit: military commsat
Kosmos 712	1975 16B	USSR	Feb 28	Plesetsk	SL-8	40	114.9	1,409	1,488	74.0	In orbit: military commsat
Kosmos 713	1975 16C	USSR	Feb 28	Plesetsk	SL-8	40	114.7	1,393	1,485	74.0	In orbit: military commsat
Kosmos 714	1975 16D	USSR	Feb 28	Plesetsk	SL-8	40	115.2	1,443	1,488	74.0	In orbit: military commsat
Kosmos 715	1975 16E	USSR	Feb 28	Plesetsk	SL-8	40	115.7	1,468	1,502	74.0	In orbit: military commsat
Kosmos 716	1975 16F	USSR	Feb 28	Plesetsk	SL-8	40	115.9	1,478	1,511	74.0	In orbit: military commsat
Kosmos 717	1975 16G	USSR	Feb 28	Plesetsk	SL-8	40	116.1	1,478	1,534	74.0	In orbit: military commsat
Kosmos 718	1975 16H	USSR	Feb 28	Plesetsk	SL-8	40	115.0	1,427	1,487	74.0	In orbit: military commsat
None	1975 17A	US	Mar 10	WTR	Titan IIIB	700	Current elements not maintained				In orbit
Kosmos 719	1975 18A	USSR	Mar 12	Tyuratam	SL-4	4,000	89.3	175	307	65.0	Reentered 3/25/75: reconnaissance
Kosmos 720	1975 19A	USSR	Mar 21	Plesetsk	SL-4	4,000	89.3	212	273	62.8	Reentered 4/1/75: reconnaissance
Kosmos 721	1975 20A	USSR	Mar 26	Plesetsk	SL-4	4,000	88.9	208	228	81.3	Reentered 4/7/75: reconnaissance—ice survey
Kosmos 722	1975 21A	USSR	Mar 27	Tyuratam	SL-4	4,000	90.0	204	337	71.4	Reentered 4/9/75: reconnaissance
Interkosmos 13	1975 22A	USSR	Mar 27	Plesetsk	SL-8	400	104.3	285	1,643	82.9	Decayed 9/2/80: upper atmosphere scientific
Meteor 21	1975 23A	USSR	Apr 1	Plesetsk	SL-3	2,200	102.4	858	887	81.2	In orbit: weather
Kosmos 723	1975 24A	USSR	Apr 2	Tyuratam	SL-11	4,500	103.7	896	966	64.7	In orbit: ocean surveillance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Soyuz 18A	None	USSR	Apr 5	Tyuratam	SL-4	6,700					Third stage bad separation sent vehicle out of control. Capsule w/ Vasili Lazarev, Oleg Makarov ejected; crew landed safely. Intended Salyut 4 visit. Flight time: 21 mns
Kosmos 724	1975 25A	USSR	Apr 7	Tyuratam	SL-11	4,500	103.0	850	949	65.6	In orbit: ocean surveillance
Kosmos 725	1975 26A	USSR	Apr 8	Plesetsk	SL-7	400	92.0	270	481	70.9	Decayed 1/6/76: military monitoring
GEOS 3	1975 27A	US	Apr 10	WTR	Delta	341	101.7	825	849	115.0	In orbit: Geodynamics Experimental Ocean Satellite
Kosmos 726	1975 28A	USSR	Apr 11	Plesetsk	SL-8	810	104.5	954	990	83.0	In orbit: navigation
None	None	US	Apr 12	WTR	Atlas F	—	—	—	—	—	Launch failure
Molniya 3-2	1975 29A	USSR	Apr 14	Plesetsk	SL-6	1,500	717.9	793	38,566	62.1	Domestic communications. Decayed 11/29/88
Kosmos 727	1975 30A	USSR	Apr 16	Tyuratam	SL-4	4,000	89.6	172	334	65.0	Reentered 4/28/75: reconnaissance
Kosmos 728	1975 31A	USSR	Apr 18	Plesetsk	SL-4	4,000	89.8	205	323	72.8	Reentered 4/29/75: reconnaissance
None	1975 32A	US	Apr 18	WTR	Titan IIIB-Agena	3,000	89.8	132	399	110.5	Reentered 6/5/75
Ariabata	1975 33A	India	Apr 19	Kapustin Yar	SL-8	360	95.1	512	537	50.7	In orbit: atmospheric research
Kosmos 729	1975 34A	USSR	Apr 22	Plesetsk	SL-8	725	104.9	972	1,006	83.0	Navigation
Kosmos 730	1975 35A	USSR	Apr 24	Plesetsk	SL-4	4,000	90.0	210	234	88.9	Reentered 5/6/75: reconnaissance—ice survey
Molniya 1-29	1975 36A	USSR	Apr 29	Plesetsk	SL-6	1,000	717.8	2,200	38,156	63.8	In orbit: domestic communications
Explorer 53	1975 37A	US	May 7	San Marco	Scout	195	94.8	506	513	3.0	Decayed 4/9/79: small astronomy
Anik 3	1975 38A	Canada	May 7	ETR	Delta	286	1,439.2	35,544	36,149	2.8	In orbit: Canadian communications
Pollux	1975 39A	France	May 17	Kourou	Diamant B-P4	35	100.2	269	1,283	29.9	Decayed 8/5/75: technology
Castor	1975 39B	France	May 17	Kourou	Diamant B-P4	77	99.6	271	1,205	29.9	Decayed 2/18/79: scientific
DSCS II-B5	1975 40A	US	May 20	ETR	Titan IIIC	566	88.3	150	249	28.6	Failed to achieve useable orbit due to transtage malfunction. Decayed 5/26/75
DSCS II-B6	1975 40B	US	May 20	ETR	Titan IIIC	566	88.0	143	222	28.8	Decayed 5/26/75: military communications
Kosmos 731	1975 41A	USSR	May 21	Tyuratam	SL-4	4,000	89.5	203	296	65.0	Reentered 6/2/75: reconnaissance
Intelsat IV F-1	1975 42A	CSC	May 22	ETR	Atlas Centaur	727	1,436.9	35,784	35,787	2.3	In orbit: commsat

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
DMSP	1975 43A	US	May 24	WTR	Thor-Burner II	194	101.7	797	881	98.7	In orbit: Defense Meteorological Satellite Program
Soyuz 18	1975 44A	USSR	May 24	Tyuratam	SL-4	6,570	88.6	186	230	51.6	Reentered 7/26/75: New duration record set by Pyotr Klimuk, Vitali Sevastyanov aboard Salyut 4. 62 days, 23 hrs, 20 mn
Kosmos 732	1975 45A	USSR	May 28	Plesetsk	SL-8	40	114.6	1,402	1,468	74.0	In orbit: miliitary commsat
Kosmos 733	1975 45B	USSR	May 28	Plesetsk	SL-8	40	116.2	1,468	1,552	74.0	In orbit: military commsat
Kosmos 734	1975 45C	USSR	May 28	Plesetsk	SL-8	40	115.0	1,441	1,469	74.0	In orbit: military commsat
Kosmos 735	1975 45D	USSR	May 28	Plesetsk	SL-8	40	115.2	1,460	1,471	74.0	In orbit: military commsat
Kosmos 736	1975 45E	USSR	May 28	Plesetsk	SL-8	40	115.5	1,467	1,485	74.0	In orbit: military commsat
Kosmos 737	1975 45F	USSR	May 28	Plesetsk	SL-8	40	115.9	1,468	1,527	74.0	In orbit: military commsat
Kosmos 738	1975 45G	USSR	May 28	Plesetsk	SL-8	40	115.7	1,466	1,508	74.0	In orbit: military commsat
Kosmos 739	1975 45H	USSR	May 28	Plesetsk	SL-8	40	114.8	1,422	1,469	74.0	In orbit: military commsat
Kosmos 740	1975 46A	USSR	May 28	Tyuratam	SL-4	4,000	89.5	173	326	62.5	Reentered 6/10/75: reconnaissance
Kosmos 741	1975 47A	USSR	May 30	Plesetsk	SL-4	4,000	88.9	210	231	81.3	Reentered 6/11/75: reconnaissance
Kosmos 742	1975 48A	USSR	Jun 3	Plesetsk	SL-4	4,000	89.8	178	355	62.9	Reentered 6/15/74: reconnaissance
Interkosmos	None	USSR	Jun 3	Plesetsk	SL-8						Failed to orbit
Molniya 1-30	1975 49A	USSR	Jun 5	Plesetsk	SL-6	1,000	717.8	1,418	38,935	64.1	Decayed 8/12/87. Domestic communications
SRET-2	1975 49B	France	Jun 5	Plesetsk	SL-6	15.4	737	513	40,825	62.8	In orbit: research
Venera 9	1975 50A	USSR	Jun 8	Tyuratam	SL-12	5,000	Circum-Venutian orbit				In orbit: Venus exploration, Venus lander, arrived 10/22
None	1975 51A	US	Jun 8	WTR	Titan IIID	13,300	88.8	154	269	96.4	Reentered 11/5/75
SSU 1	1975 51C	US	Jun 8	WTR	Titan IIID	—	113.6	1,385	1,393	95.1	In orbit
Nimbus 6	1975 52A	US	Jun 12	WTR	Delta	829	107.4	1,099	1,112	99.6	In orbit: weather technology
Kosmos 743	1975 53A	USSR	Jun 12	Plesetsk	SL-4	4,000	89.5	179	319	62.8	Reentered 6/25/75: reconnaissance
Venera 10	1975 54A	USSR	Jun 14	Tyuratam	SL-12	5,000	Circum-Venusian orbit				In orbit: Venus exploration, Venus lander, arrived 10/25
None	1975 55A	US	Jun 18	ETR	Atlas-Agena	350	Current elements not maintained				In orbit

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 744	1975 56A	USSR	Jun 20	Plesetsk	SL-3	2,500	96.1	556	585	81.3	Military elint. Decayed 10/12/91
OSO 8	1975 57A	US	Jun 21	ETR	Delta	1,066	94.0	467	475	32.9	Decayed 7/9/86. Orbiting Solar Observatory
Kosmos 745	1975 58A	USSR	Jun 24	Plesetsk	SL-7	400	92.4	264	514	71	Decayed 3/12/76: military monitoring
Kosmos 746	1975 59A	USSR	Jun 25	Plesetsk	SL-4	4,000	89.5	180	325	62.8	Reentered 7/8/75: reconnaissance
Kosmos 747	1975 60A	USSR	Jun 27	Plesetsk	SL-4	4,000	89.3	193	291	62.8	Reentered 7/9/75: reconnaissance
Kosmos 748	1975 61A	USSR	Jul 3	Plesetsk	SL-4	4,000	89.4	178	317	62.8	Reentered 7/16/75: reconnaissance
Kosmos 749	1975 62A	USSR	Jul 4	Plesetsk	SL-8	900	95.1	505	553	74.0	Decayed 9/26/80: military elint
Molniya 2-13	1975 63A	USSR	Jul 8	Plesetsk	SL-6	1,250	718.6	1,247	39,147	64.2	In orbit: domestic communications
Meteor 2-1	1975 64A	USSR	Jul 11	Plesetsk	SL-3	2,800	102.3	847	885	81.3	In orbit: experimental weather
Soyuz 19	1975 65A	USSR	Jul 15	Tyuratam	SL-4	6,182	88.5	186	220	51.8	Reentered 7-21-75: joint US/Soviet mission (Apollo/Soyuz Test Project). Alexei Leonov, Valeri Kubasov docked on 36th orbit. Mission duration 5 days, 22 hrs, 3 mn
ASTP/Apollo 18	1975 66A	US	Jul 15	ETR	Saturn 1B	14,768	88.4	170	228	51.8	Splashed down 7/24/75: joint US/Soviet mission (Apollo/Soyuz Test Project). Thomas Stafford, Vance Brand, Deke Slayton met with Soyuz 19. Remained in orbit 9 days, 1 hr, 28 mn
Kosmos 750	1975 67A	USSR	Jul 17	Plesetsk	SL-7	400	94.6	267	737	71.0	Decayed 9/29/77: military monitoring
Kosmos 751	1975 68A	USSR	Jul 23	Plesetsk	SL-4	4,000	89.6	197	313	62.8	Reentered 8/4/75: reconnaissance
Kosmos 752	1975 69A	USSR	Jul 24	Plesetsk	SL-8	900	90.9	308	324	65.8	Decayed 2/28/81: military monitoring
China 3	1975 70A	PRC	Jul 26	Shuang Cheng Tzu	CZ-2	1,107	91.0	184	461	69.0	Decayed 9-14-75
Kosmos 753	1975 71A	USSR	Jul 31	Plesetsk	SL-4	4,000	89.6	181	330	62.8	Reentered 8/13/75: reconnaissance
Cos-B	1975 72A	ESA*	Aug 9	WTR	Delta	280	22,261	342	99,873	90.1**	In orbit: scientific
Kosmos 754	1975 73A	USSR	Aug 13	Tyuratam	SL-4	4,000	89.8	204	326	71.4	Reentered 8/26/75: reconnaissance

*European Space Agency
**Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 755	1975 74A	USSR	Aug 14	Plesetsk	SL-8	810	104.9	967	1,007	82.9	In orbit: navigation
Viking 1	1975 75A	US	Aug 20	ETR	Titan IIIE-Centaur	3,399	Areocentric Orbit				Mars orbiter/lander. In orbit 6/19/76; died 8/7/80. Landed 7/20/76; died 11/82
Kosmos 756	1975 76A	USSR	Aug 22	Plesetsk	SL-3	2,500	95.9	558	564	81.2	In orbit: elint
Symphonie-B	1975 77A	FR/FRG	Aug 27	ETR	Delta	398	1,440.5	35,870	35,873	5.4	In orbit: French-German commsat
Kosmos 757	1975 78A	USSR	Aug 27	Plesetsk	SL-4	4,000	89.5	102	316	62.8	Reentered 9/9/75: reconnaissance
Molniya 1-31	1975 79A	USSR	Sep 2	Plesetsk	SL-6	1,000	717.9	1,684	38,673	64.9	Decayed 11/19/86. Domestic communications
Kosmos 758	1975 80A	USSR	Sep 5	Plesetsk	SL-4	4,000	89.5	174	326	67.1	Exploded 9/6/75, 72 pieces, reconnaissance
Molniya 2-14	1975 81A	USSR	Sep 9	Plesetsk	SL-6	1,250	717.8	2,006	38,347	63.8	In orbit: Domestic Communications
Kiku (ETS 1)	1975 82A	Japan	Sep 9	Tanegashima	N-1	85	106.0	976	1,104	47.0	In orbit: applications technology
Viking 2	1975 83A	US	Sep 9	ETR	Titan IIIE-Centaur	3,399	Areocentric orbit				Mars orbiter/lander. In orbit 8/7/76; died 7/24/80. Landed 9/3/76; died 4/12/78
Kosmos 759	1975 84A	USSR	Sep 12	Plesetsk	SL-4	4,000	89.6	231	276	62.8	Reentered 9/23/75: reconnaissance
Kosmos 760	1975 85A	USSR	Sep 16	Tyuratam	SL-4	4,000	89.6	174	335	65.0	Reentered 9/30/75: reconnaissance
Kosmos 761	1975 86A	USSR	Sep 17	Plesetsk	SL-8	40	114.8	1,397	1,481	74.0	In orbit: military commsat
Kosmos 762	1975 86B	USSR	Sep 17	Plesetsk	SL-8	40	115.1	1,435	1,483	74.0	In orbit: military commsat
Kosmos 763	1975 86C	USSR	Sep 17	Plesetsk	SL-8	40	115.8	1,473	1,507	74.0	In orbit: military commsat
Kosmos 764	1975 86D	USSR	Sep 17	Plesetsk	SL-8	40	116.0	1,477	1,524	74.0	In orbit: military commsat
Kosmos 765	1975 86E	USSR	Sep 17	Plesetsk	SL-8	40	116.3	1,476	1,548	74.0	In orbit: military commsat
Kosmos 766	1975 86F	USSR	Sep 17	Plesetsk	SL-8	40	114.9	1,425	1,483	74.0	In orbit: military commsat
Kosmos 767	1975 86G	USSR	Sep 17	Plesetsk	SL-8	40	115.3	1,453	1,485	74.0	In orbit: military commsat
Kosmos 768	1975 86H	USSR	Sep 17	Plesetsk	SL-8	40	115.5	1,470	1,489	74.0	In orbit: military commsat
Meteor 22	1975 87A	USSR	Sep 18	Plesetsk	SL-3	2,200	102.2	801	920	81.3	In orbit: weather
Kosmos 769	1975 88A	USSR	Sep 23	Plesetsk	SL-4	4,000	89.6	203	307	72.3	Reentered 10/5/75: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 770	1975 89A	USSR	Sep 24	Plesetsk	SL-8	850	109.1	1,163	1,205	83.0	In orbit: navigation/ geodetic
Kosmos 771	1975 90A	USSR	Sep 25	Plesetsk	SL-4	4,000	88.7	203	219	81.3	Reentered 10/8/75: reconnaissance—ice survey
Intelsat IVA F-1	1975 91A	CSC	Sep 26	ETR	Atlas-Centaur	1,500	1,441.0	35,860	35,902	2.6	In orbit: communications
D2-B	1975 92A	France	Sep 27	Kourou	Diamant B-P4	115	93.7	411	499	37.2	Decayed 9/30/82: solar U-V emissions study
Kosmos 772	1975 93A	USSR	Sep 29	Tyuratam	SL-4	6,570	89.4	195	299	51.8	Reentered 10/2/75: Soyuz test flight
Kosmos 773	1975 94A	USSR	Sep 30	Plesetsk	SL-8	750	100.7	780	798	74.1	In orbit: military communications
Kosmos 774	1975 95A	USSR	Oct 1	Tyuratam	SL-4	4,000	89.7	204	315	71.4	Reentered 10/15/75: reconnaissance
Explorer 54	1975 96A	US	Oct 6	WTR	Delta	676	118.5	141	3,093	90.0	Decayed 3/12/76: atmospheric
Kosmos 775	1975 97A	USSR	Oct 8	Tyuratam	SL-12	5,000	1,437.3	35,521	36,100	7.2	In orbit: possible early warning
None	1975 98A	US	Oct 9	WTR	Titan IIIB-Agena	3,000	89.3	123	354	96.4	Reentered 11/30/75
Tip 2	1975 99A	US	Oct 12	WTR	Scout	94	96.8	527	683	90.4	Communication/navigation. Decayed 5/26/91
GOES 1	1975 100A	US	Oct 16	ETR	Delta	295	1,436.8	35,795	35,804	6.7	In orbit: Geostationary Operational Environmental Satellite
Luna	None	USSR	Oct 16	Tyuratam	SL-12						Lunar probe; failed to orbit
Kosmos 776	1975 101A	USSR	Oct 17	Plesetsk	SL-4	4,000	89.4	203	310	62.8	Reentered 10/29/75: reconnaissance
Kosmos 777	1975 102A	USSR	Oct 29	Tyuratam	SL-11	4,000	89.3	123	412	64.9	Decayed 6/3/76: monitoring. Exploded 1/25/76, 65 pieces
Kosmos 778	1975 103A	USSR	Nov 4	Plesetsk	SL-8	810	104.8	968	1,001	83.0	In orbit: navigation
Kosmos 779	1975 104A	USSR	Nov 4	Plesetsk	SL-4	4,000	89.4	188	334	62.8	Reentered 11/18/75: reconnaissance
Molniya 3-3	1975 105A	USSR	Nov 14	Plesetsk	SL-6	1,500	717.9	2,188	38,170	64.0	In orbit: domestic communications
Soyuz 20	1975 106A	USSR	Nov 17	Tyuratam	SL-4	6,570	91.3	339	345	51.5	Reentered 2/16/76: docked with Salyut 4
Explorer 55	1975 107A	US	Nov 20	ETR	Delta	721	93.6	447	449	19.6	Decayed 6/10/81: atmospheric
Kosmos 780	1975 108A	USSR	Nov 21	Tyuratam	SL-4	4,000	89.3	206	298	65.0	Reentered 12/3/75: reconnaissance
Kosmos 781	1975 109A	USSR	Nov 21	Plesetsk	SL-8	900	95.1	506	549	74.0	Decayed 11/26/80: military elint
Kosmos 782	1975 110A	USSR	Nov 25	Plesetsk	SL-4	4,000	90.5	227	405	62.8	Reentered 12/15/75: biological research

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
China 4	1975 111A	PRC	Nov 26	Shuang Cheng Tzu	CZ-2	2,500	91.0	179	479	62.9	Decayed 12/29/75
Kosmos 783	1975 112A	USSR	Nov 28	Plesetsk	SL-8	750	100.8	787	805	74.1	In orbit: military communications
Kosmos 784	1975 113A	USSR	Dec 3	Plesetsk	SL-4	4,000	89.0	216	252	81.3	Reentered 12/15/75: reconnaissance—ice survey
None	1975 114A	US	Dec 4	WTR	Titan IIID	13,300	88.4	157	240	96.2	Reentered 4/1/76
None	1975 114B	US	Dec 4	WTR	Titan IIID	60	103	236	1,558	98.3	Decayed 5/1/78
Explorer	None	US	Dec 5	WTR	Scout	71					Failed to orbit (Dual air density)
Interkosmos 14	1975 115A	USSR	Dec 11	Plesetsk	SL-8	700	96.5	300	683	74.0	Decayed 2/27/83: scientific
Kosmos 785	1975 116A	USSR	Dec 12	Tyuratam	SL-11	4,500	104.2	887	1,025	65.1	In orbit: ocean surveillance
Satcom-1	1975 117A	US	Dec 13	ETR	Delta	464	1,445.8	35,878	36,075	2.7	In orbit: U.S. domestic communications
None	1975 118A	US	Dec 14	ETR	Titan IIIC	820	1,433.4	35,621	35,844	4.4	In orbit: military communications
China 5	1975 119A	PRC	Dec 16	Shuang Cheng Tzu	CZ-2	1,109	89.9	187	360	68.9	Decayed 1/27/76
Kosmos 786	1975 120A	USSR	Dec 16	Tyuratam	SL-4	4,000	89.5	180	347	65.0	Reentered 12/29/75: reconnaissance
Molniya 2-15	1975 121A	USSR	Dec 17	Plesetsk	SL-6	1,250	717.8	1,325	39,031	64.1	Decayed 3/7/87. Domestic communications
Prognoz 4	1975 122A	USSR	Dec 22	Tyuratam	SL-6	905	5,740	634	199,000	65.0*	In orbit: scientific
Raduga 1	1975 123A	USSR	Dec 22	Tyuratam	SL-12	5,000	1,316.7	33,395	33,437	3.5	In orbit: communications
Meteor 23	1975 124A	USSR	Dec 25	Plesetsk	SL-3	2,200	102.2	842	885	81.3	In orbit: weather
Molniya 3-4	1975 125A	USSR	Dec 27	Plesetsk	SL-6	1,500	718.1	1,294	39,074	64.1	Decayed 8/12/86. Domestic communications
Kosmos 787	1976 1A	USSR	Jan 6	Plesetsk	SL-8	900	95.2	516	545	74.0	Decayed 12/12/80: ferret
Kosmos 788	1976 2A	USSR	Jan 7	Plesetsk	SL-4	4,000	89.5	183	321	62.8	Reentered 1/20/76: reconnaissance
Helios 2	1976 3A	FRG	Jan 15	ETR	Titan IIIE-Centaur	376		Heliocentric Orbit			In orbit: solar probe
CTS	1976 4A	Can	Jan 17	ETR	Delta	500	1,436.5	35,735	35,855	7.2	In orbit: Canadian communications
Kosmos 789	1976 5A	USSR	Jan 20	Plesetsk	SL-8	810	104.9	966	1,013	83.0	In orbit: navigation

*Initial elements, current elements unknown

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Molniya 1-32	1976 6A	USSR	Jan 22	Tyuratam	SL-6	1,000	720.4	2,425	38,060	63.7	In orbit: domestic communications
Kosmos 790	1976 7A	USSR	Jan 22	Plesetsk	SL-8	900	95.1	511	549	74.0	Decayed 11/12/80: ferret
Kosmos 791	1976 8A	USSR	Jan 28	Plesetsk	SL-8	40	114.7	1,400	1,484	74.0	In orbit: military commsat
Kosmos 792	1976 8B	USSR	Jan 28	Plesetsk	SL-8	40	115.1	1,434	1,486	74.1	In orbit: military commsat
Kosmos 793	1976 8C	USSR	Jan 28	Plesetsk	SL-8	40	114.9	1,416	1,488	74.1	In orbit: military commsat
Kosmos 794	1976 8D	USSR	Jan 28	Plesetsk	SL-8	40	115.3	1,450	1,492	74.0	In orbit: military commsat
Kosmos 795	1976 8E	USSR	Jan 28	Plesetsk	SL-8	40	115.6	1,464	1,497	74.1	In orbit: military commsat
Kosmos 796	1976 8F	USSR	Jan 28	Plesetsk	SL-8	40	115.8	1,469	1,514	74.1	In orbit: military commsat
Kosmos 797	1976 8G	USSR	Jan 28	Plesetsk	SL-8	40	116.0	1,476	1,528	74.1	In orbit: military commsat
Kosmos 798	1976 8H	USSR	Jan 28	Plesetsk	SL-8	40	116.3	1,476	1,553	74.1	In orbit: military commsat
Kosmos 799	1976 9A	USSR	Jan 29	Tyuratam	SL-4	4,000	89.6	210	328	71.4	Reentered 2/10/76: reconnaissance
Intelsat IVA F-2	1976 10A	COMSAT	Jan 30	ETR	Atlas-Centaur	1,500	1,442.7	35,904	35,926	2.6	In orbit: communications
Kosmos 800	1976 11A	USSR	Feb 3	Plesetsk	SL-8	650	105.0	977	1,010	83.0	In orbit: navigation
Corsa	—	Japan	Feb 4	Uchinoura	Mu 3C	92	—	—	—	—	Failed to reach orbit
Kosmos 801	1976 12A	USSR	Feb 5	Plesetsk	SL-7	400	93.9	260	677	70.9	Decayed 1/5/78: minor military
Kosmos 802	1976 13A	USSR	Feb 11	Tyuratam	SL-4	4,000	89.6	180	355	65.0	Reentered 2/25/76: reconnaissance
Kosmos 803	1976 14A	USSR	Feb 12	Plesetsk	SL-8	300	96.0	536	594	65.8	In orbit: interceptor target
Kosmos 804	1976 15A	USSR	Feb 16	Tyuratam	SL-11	2,000	93.0	149	703	65.1	Reentered 2/16/76: interceptor
DMSP	1976 16A	US	Feb 19	WTR	Thor Burner II	175	89.0	90	355	98.9	Decayed 2/19/76
Marisat 1	1976 17A	COMSAT	Feb 19	ETR	Delta	655	1,436.1	35,770	35,803	2.2	In orbit: maritime communications
Kosmos 805	1976 18A	USSR	Feb 20	Plesetsk	SL-4	4,000	89.7	181	372	67.2	Reentered 3/11/76: reconnaissance
UME (ISS 1)	1976 19A	Japan	Feb 29	Tanegashima	N-1	139	105.1	988	1,009	69.7	In orbit: ionospheric sounding
Kosmos 806	1976 20A	USSR	Mar 10	Tyuratam	SL-4	4,000	89.7	182	353	71.4	Reentered 3/23/76: reconnaissance
Molniya 1-33	1976 21A	USSR	Mar 11	Plesetsk	SL-6	1,000	717.8	1,178	39,176	62.9	Domestic communications. Decayed 10/10/90

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 807	1976 22A	USSR	Mar 12	Plesetsk	SL-8	400	106.7	388	1,760	82.9	In orbit: minor military
LES 8	1976 23A	USAF	Mar 15	ETR	Titan IIIC	454	1,435.6	35,764	35,788	22.1	In orbit: communications
LES 9	1976 23B	USAF	Mar 15	ETR	Titan IIIC	454	1,436.1	35,782	35,790	22.1	In orbit: communications
Solrad IIA	1976 23C	USAF	Mar 15	ETR	Titan IIIC	181	Current elements not maintained				In orbit: solar study
Solrad IIB	1976 23D	USAF	Mar 15	ETR	Titan IIIC	181	Current elements not maintained				In orbit: solar study
Kosmos 808	1976 24A	USSR	Mar 16	Plesetsk	SL-3	3,000	95.8	544	569	81.2	In orbit: ferret
Kosmos 809	1976 25A	USSR	Mar 18	Tyuratam	SL-4	4,000	89.6	210	322	65.0	Reentered 3/30/76: reconnaissance
Molniya 1-34	1976 26A	USSR	Mar 19	Tyuratam	SL-6	1,000	718.0	1,352	39,012	64.0	Decayed 5/14/85: domestic communications
None	1976 27A	US	Mar 22	WTR	Titan IIIB-Agena D	3,000	89.1	130	331	96.4	Reentered 5/18/76
Kosmos 810	1976 28A	USSR	Mar 26	Plesetsk	SL-4	4,000	89.6	188	358	62.8	Reentered 4/8/76: reconnaissance
RCA-Satcom-2	1976 29A	NASA	Mar 26	ETR	Delta	463	1,460.1	36,000	36,510	2.3	In orbit: domestic communications
Kosmos 811	1976 30A	USSR	Mar 31	Plesetsk	SL-4	4,000	89.9	212	361	72.9	Reentered 4/12/76: reconnaissance
Kosmos 812	1976 31A	USSR	Apr 6	Plesetsk	SL-8	900	95.1	509	544	74.0	Decayed 10/30/80: ferret
Meteor 24	1976 32A	USSR	Apr 7	Plesetsk	SL-3	2,200	102.1	831	888	81.3	In orbit: weather
Kosmos 813	1976 33A	USSR	Apr 9	Plesetsk	SL-4	4,000	89.0	212	250	81.3	Reentered 4/21/76: reconnaissance
Kosmos 814	1976 34A	USSR	Apr 13	Tyuratam	SL-11	2,000	90.6	118	480	65.1	Reentered 4/13/76: interceptor
NATO III-A	1976 35A	NATO	Apr 22	ETR	Delta	310	1,436.3	35,779	35,799	5.3	In orbit: NATO communications
Kosmos 815	1976 36A	USSR	Apr 28	Plesetsk	SL-4	4,000	89.0	218	254	81.3	Reentered 5/11/76: reconnaissance
Kosmos 816	1976 37A	USSR	Apr 28	Plesetsk	SL-8	950	94.5	470	521	65.8	Decayed 11/24/79: interceptor program-related
NOSS-1	1976 38A	US	Apr 30	WTR	Atlas	—	107.4	976	1,240	63.4	In orbit: Navy ocean surveillance
SSU-1	1976 38C	US	Apr 30	WTR	Atlas	—	107.5	971	1,246	63.4	In orbit: Navy ocean surveillance
SSU-2	1976 38D	US	Apr 30	WTR	Atlas	—	107.5	971	1,246	63.4	In orbit: Navy ocean surveillance
SSU-3	1976 38J	US	Apr 30	WTR	Atlas	—	107.5	975	1,242	63.4	In orbit: Navy ocean surveillance
LAGEOS-1	1976 39A	NASA	May 4	WTR	Delta	411	225.4	5,837	5,946	109.8	In orbit: laser ranging geodetic

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			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 817	1976 40A	USSR	May 5	Tyuratam	SL-4	4,000	89.5	178	347	65.0	Reentered 5/18/76: reconnaissance
Molniya 3-5	1976 41A	USSR	May 12	Plesetsk	SL-6	1,500	714.7	394	39,808	62.8	Domestic communications. Decayed 4/14/90
Comstar 1	1976 42A	COMSAT	May 13	ETR	Atlas-Centaur	792	1,436.2	35,758	35,820	3.8	In orbit: domestic communications
Meteor 25	1976 43A	USSR	May 15	Plesetsk	SL-3	2,200	102.1	832	884	81.3	In orbit: weather
Kosmos 818	1976 44A	USSR	May 18	Plesetsk	SL-7	400	90.5	247	359	71.0	Decayed 3/7/77: minor military
Kosmos 819	1976 45A	USSR	May 20	Tyuratam	SL-4	4,000	89.5	204	307	65.0	Reentered 6/1/76: reconnaissance
Kosmos 820	1976 46A	USSR	May 21	Plesetsk	SL-4	4,000	88.8	214	236	81.4	Reentered 6/2/76: reconnaissance
P 76-5	1976 47A	USAF	May 22	WTR	Scout	73	105.5	987	1,051	99.6	In orbit: communication propogation experiment
Kosmos 821	1976 48A	USSR	May 26	Plesetsk	SL-4	4,000	89.7	212	338	72.8	Reentered 6/8/76: reconnaissance
Kosmos 822	1976 49A	USSR	May 28	Plesetsk	SL-8	550	94.1	276	677	74.0	Decayed 8/8/78: minor military
None	1976 50A	USAF	Jun 2	WTR	Titan IIIB	700	Current elements not maintained				In orbit
Kosmos 823	1976 51A	USSR	Jun 2	Plesetsk	SL-8	650	104.9	971	1,007	83.0	In orbit: navigation
Kosmos 824	1976 52A	USSR	Jun 8	Tyuratam	SL-4	4,000	89.8	209	345	71.4	Reentered 6/21/76: reconnaissance
Marisat 2	1976 53A	US	Jun 10	ETR	Delta	362	1,436.1	35,779	35,796	4.4	In orbit: maritime commsat
Kosmos 825	1976 54A	USSR	Jun 15	Plesetsk	SL-8	40	114.7	1,393	1,485	74.0	In orbit: military commsat
Kosmos 826	1976 54B	USSR	Jun 15	Plesetsk	SL-8	40	116.2	1,479	1,543	74.0	In orbit: military commsat
Kosmos 827	1976 54C	USSR	Jun 15	Plesetsk	SL-8	40	114.9	1,410	1,488	74.0	In orbit: military commsat
Kosmos 828	1976 54D	USSR	Jun 15	Plesetsk	SL-8	40	115.1	1,431	1,487	74.0	In orbit: military commsat
Kosmos 829	1976 54E	USSR	Jun 15	Plesetsk	SL-8	40	115.3	1,448	1,488	74.0	In orbit: military commsat
Kosmos 830	1976 54F	USSR	Jun 15	Plesetsk	SL-8	40	115.5	1,467	1,490	74.0	In orbit: military commsat
Kosmos 831	1976 54G	USSR	Jun 15	Plesetsk	SL-8	40	115.8	1,473	1,505	74.0	In orbit: military commsat
Kosmos 832	1976 54H	USSR	Jun 15	Plesetsk	SL-8	40	116.0	1,481	1,518	74.0	In orbit: military commsat
Kosmos 833	1976 55A	USSR	Jun 16	Plesetsk	SL-4	4,000	89.5	189	335	62.8	Reentered 6/29/76: reconnaissance
Interkosmos 15	1976 56A	USSR	Jun 19	Plesetsk	SL-8	550	94.5	483	515	74.0	Decayed 11/18/79: scientific
Salyut 5	1976 57A	USSR	Jun 22	Tyuratam	SL-13	19,000	89.2	230	245	51.5	Reentered 8/8/77: space station. Capsule ejected 2/26/77

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 834	1976 58A	USSR	Jun 24	Plesetsk	SL-4	4,000	89.1	223	263	81.4	Reentered 7/6/76: arctic survey
None	1976 59A	USAF	Jun 26	ETR	Titan IIIC	820	Current elements not maintained				In orbit
Kosmos 835	1976 60A	USSR	Jun 29	Tyuratam	SL-4	4,000	89.4	180	338	65.0	Reentered 7/12/76: reconnaissance
Kosmos 836	1976 61A	USSR	Jun 29	Plesetsk	SL-8	750	100.8	781	809	74.1	In orbit: specialized military communications
Kosmos 837	1976 62A	USSR	Jul 1	Plesetsk	SL-6	1,250	94.3	394	576	62.7	Decayed 11/18/83
Kosmos 838	1976 63A	USSR	Jul 2	Tyuratam	SL-11	4,500	93.3	428	448	65.0	Decayed 8/23/77: ocean surveillance. Exploded 5/17/77, 41 pieces
Soyuz 21	1976 64A	USSR	Jul 6	Tyuratam	SL-4	6,570	88.7	193	253	51.6	Reentered 8/24/76: Boris Volynov, Vitali Zholobov aboard. Docked with Salyut 5. Mission duration 49 days, 6 hrs, 24 mn
None	1976 65A	USAF	Jul 8	WTR	Titan IIID	13,000	88.4	156	234	97.01	Reentered 12/13/76
SESP74-2	1976 65B	USAF	Jul 8	WTR	Titan IIID	—	179	236	8,048	97.5	Decayed 4/24/86
None	1976 65C	USAF	Jul 8	WTR	Titan IIID	60	Current elements not maintained				In orbit
Palapa 1	1976 66A	Indo	Jul 8	ETR	Delta	300	1,436.3	35,765	35,818	0.8	In orbit: Indonesian communications
Kosmos 839	1976 67A	USSR	Jul 8	Plesetsk	SL-8	400	115.7	916	2,054	65.9	In orbit: interceptor target. Exploded 9/29/77, 56 pieces
Kosmos 840	1976 68A	USSR	Jul 14	Plesetsk	SL-4	4,000	89.7	212	343	72.9	Reentered 7/26/76: reconnaissance
Kosmos 841	1976 69A	USSR	Jul 15	Plesetsk	SL-8	750	100.6	777	798	74.0	In orbit: specialized military commsat
Kosmos 842	1976 70A	USSR	Jul 21	Plesetsk	SL-8	650	104.8	965	1,006	83.0	In orbit: navigation
Kosmos 843	1976 71A	USSR	Jul 21	Tyuratam	SL-11	2,000	89.4	132	346	65.1	Reentered 7/21/76: interceptor
Kosmos 844	1976 72A	USSR	Jul 22	Plesetsk	SL-4	4,000	89.8	181	385	67.1	Reentered 8/30/76: reconnaissance. Exploded 7/25/76, 249 pieces
Comstar 2	1976 73A	COMSAT	Jul 22	ETR	Atlas-Centaur	792	1,436.2	35,785	35,791	2.4	In orbit: domestic communications
Molniya 1-35	1976 74A	USSR	Jul 23	Tyuratam	SL-6	1,000	717.9	973	39,386	64.0	Decayed 5/29/87. Communications
Kosmos 845	1976 75A	USSR	Jul 27	Plesetsk	SL-8	900	95.2	510	548	74.0	Decayed 11/15/80: ferret

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Interkosmos 16	1976 76A	USSR	Jul 27	Kapustin Yar	SL-8	550	94.4	463	518	50.5	Decayed 7/10/79: solar X-rays
NOAA 5	1976 77A	NOAA/ US	Jul 29	WTR	Delta	340	116.2	1,503	1,519	101.9	In orbit: weather. 2nd stage exploded 12/24/76, 140 pieces in orbit
Kosmos 846	1976 78A	USSR	Jul 29	Plesetsk	SL-8	650	104.7	948	1,009	82.9	In orbit: navigation
Kosmos 847	1976 79A	USSR	Aug 4	Plesetsk	SL-4	4,000	89.5	189	342	62.8	Reentered 8/17/76: reconnaissance
Satellite Data Systems 2	1976 80A	US	Aug 6	WTR	Titan IIIB-Agena	700	Current elements not maintained				In orbit
Luna 24	1976 81A	USSR	Aug 9	Tyuratam	SL-12	4,800	Trans-lunar trajectory				Recovered 8/18/76: lunar sample return
Kosmos 848	1976 82A	USSR	Aug 12	Plesetsk	SL-4	4,000	89.6	214	325	62.8	Reentered 8/25/76: reconnaissance
Kosmos 849	1976 83A	USSR	Aug 18	Plesetsk	SL-7	400	95.3	260	813	70.9	Decayed 8/24/78: minor military
Kosmos 850	1976 84A	USSR	Aug 26	Plesetsk	SL-7	400	91.4	259	432	70.9	Decayed 5/16/77: minor military
Kosmos 851	1976 85A	USSR	Aug 27	Plesetsk	SL-3	3,000	94.0	453	490	81.2	Ferret. Decayed 8/5/89
Kosmos 852	1976 86A	USSR	Aug 28	Tyuratam	SL-4	4,000	89.5	179	354	65.0	Reentered 9/10/76: reconnaissance
China 6	1976 87A	PRC	Aug 30	Shuang Cheng Tzu	CZ-2	1,108	107.5	194	2,030	69.0	Decayed 11/25/78: ferret
Kosmos 853	1976 88A	USSR	Sep 1	Plesetsk	SL-6	1,250	91.7	243	461	62.8	Decayed 12/31/76: failed molniya
Tip 3	1976 89A	NASA/ Navy	Sep 1	WTR	Scout	94	93.9	380	548	89.3	Decayed 5/30/81: transit navsat
Kosmos 854	1976 90A	USSR	Sep 3	Plesetsk	SL-4	4,000	88.9	163	278	81.3	Reentered 9/16/76: reconnaissance
AMS 1 (DMSP)	1976 91A	US	Sep 11	WTR	Thor Burner 2	450	101.3	806	834	98.6	In orbit: weather
Raduga 2	1976 92A	USSR	Sep 11	Tyuratam	SL-12	2,000	1,433.6	26,783	44,692	2.4	In orbit: communications
Soyuz 22	1976 93A	USSR	Sep 15	Tyuratam	SL-4	6,570	89.6	250	280	65.0	Returned 9/23/76: Valeri Bykovsky, Vladimir Aksyonov aboard. 7 days, 21 hrs, 52 mn
None	1976 94A	US	Sep 15	WTR	Titan IIIB-Agena	3,000	89.2	134	336	96.3	Reentered 11/5/76
Kosmos 855	1976 95A	USSR	Sep 21	Plesetsk	SL-4	4,000	89.9	212	366	72.9	Reentered 10/3/76: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 856	1976 96A	USSR	Sep 22	Tyuratam	SL-4	4,000	89.5	210	322	65.0	Reentered 10/5/76: reconnaissance
Kosmos 857	1976 97A	USSR	Sep 24	Plesetsk	SL-4	4,000	89.5	185	346	62.8	Reentered 10/7/76: reconnaissance
Kosmos 858	1976 98A	USSR	Sep 29	Plesetsk	SL-8	750	100.7	783	802	74.1	In orbit: specialized military communications
Kosmos 859	1976 99A	USSR	Oct 10	Tyuratam	SL-4	4,000	89.6	180	380	65.0	Reentered 10/21/76: reconnaissance
Soyuz 23	1976 100A	USSR	Oct 14	Tyuratam	SL-4	6,570	89.5	243	275	51.6	Returned 10/16/76: Vyacheslav Zudov, Valeri Rozhdestvensky aboard. Salyut 5 rendezvous failed; emergency landing after 2 days, 6 mn
Marisat 3	1976 101A	US	Oct 14	ETR	Delta	362	1,436.1	35,780	35,791	5.9	In orbit: maritime communications
Meteor 26	1976 102A	USSR	Oct 15	Plesetsk	SL-3	2,200	102.3	848	885	81.3	In orbit: weather
Kosmos 860	1976 103A	USSR	Oct 17	Tyuratam	SL-11	4,500	104.3	930	990	64.7	In orbit: ocean surveillance
Kosmos 861	1976 104A	USSR	Oct 21	Tyuratam	SL-11	4,500	104.2	919	999	64.9	In orbit: ocean surveillance
Kosmos 862	1976 105A	USSR	Oct 22	Plesetsk	SL-6	1,250	717.8	2,857	37,497	67.3	In orbit: early warning. Exploded 3/15/77, 14 pieces
Kosmos 863	1976 106A	USSR	Oct 22	Plesetsk	SL-4	4,000	89.8	187	370	62.8	Reentered 11/1/76: reconnaissance
EKRAN	1976 107A	USSR	Oct 26	Tyuratam	SL-12	2,000	1,435.7	35,511	36,044	7.6	In orbit: communications
Kosmos 864	1976 108A	USSR	Oct 29	Plesetsk	SL-8	810	104.7	959	1,005	82.9	In orbit: navigation
Kosmos 865	1976 109A	USSR	Nov 1	Plesetsk	SL-4	4,000	89.8	212	350	72.9	Reentered 11/13/76: reconnaissance
Kosmos 866	1976 110A	USSR	Nov 11	Tyuratam	SL-4	4,000	89.1	182	306	65.0	Reentered 11/23/76: reconnaissance
Kosmos 867	1976 111A	USSR	Nov 23	Plesetsk	SL-4	4,000	91.0	258	418	62.8	Reentered 12/6/76: reconnaissance
Prognoz 5	1976 112A	USSR	Nov 25	Tyuratam	SL-6	930	5,713	510	19,900	65*	In orbit: scientific
Kosmos 868	1976 113A	USSR	Nov 26	Tyuratam	SL-11	4,500	93.2	422	443	65.0	Decayed 7/8/78: ocean surveillance
Kosmos 869	1976 114A	USSR	Nov 29	Tyuratam	SL-4	6,570	89.3	202	307	51.8	Reentered 12/17/76: unmanned Soyuz
Kosmos 870	1976 115A	USSR	Dec 2	Plesetsk	SL-8	900	95.2	513	548	73.9	Decayed 12/20/80: ferret
Molniya 2-16	1976 116A	USSR	Dec 2	Plesetsk	SL-6	1,250	718.3	746	39,622	63.2	Domestic communications. Decayed 2/21/91
China 7	1976 117A	PRC	Dec 7	Shuang Cheng Tzu	CZ-2	2,500	89.0	163	293	59.4	Reentered 1/2/77: reconnaissance

*Initial elements. Current elements unknown

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 871	1976 118A	USSR	Dec 7	Plesetsk	SL-8	40	114.6	1,415	1,463	74.0	In orbit: military commsat
Kosmos 872	1976 118B	USSR	Dec 7	Plesetsk	SL-8	40	114.4	1,398	1,462	74.0	In orbit: military commsat
Kosmos 873	1976 118C	USSR	Dec 7	Plesetsk	SL-8	40	115.5	1,462	1,494	74.0	In orbit: military commsat
Kosmos 874	1976 118D	USSR	Dec 7	Plesetsk	SL-8	40	115.7	1,463	1,513	74.0	In orbit: military commsat
Kosmos 875	1976 118E	USSR	Dec 7	Plesetsk	SL-8	40	114.9	1,434	1,462	74.0	In orbit: military commsat
Kosmos 876	1976 118F	USSR	Dec 7	Plesetsk	SL-8	40	116.0	1,463	1,538	74.0	In orbit: military commsat
Kosmos 877	1976 118G	USSR	Dec 7	Plesetsk	SL-8	40	115.1	1,452	1,463	74.0	In orbit: military commsat
Kosmos 878	1976 118H	USSR	Dec 7	Plesetsk	SL-8	40	115.3	1,463	1,472	74.0	In orbit: military commsat
Kosmos 879	1976 119A	USSR	Dec 9	Plesetsk	SL-3	4,000	88.9	217	241	81.4	Reentered 12/22/76: reconnaissance
Kosmos 880	1976 120A	USSR	Dec 9	Plesetsk	SL-8	900	96.4	559	617	65.8	Decayed 10/8/79: interceptor target. Exploded 11/27/78, 50 pieces
Kosmos 881	1976 121A	USSR	Dec 15	Tyuratam	SL-13	6,000	88.7	202	248	51.6	Reentered 12/15/76: Test of Merkur capsule
Kosmos 882	1976 121B	USSR	Dec 15	Tyuratam	SL-13	6,000	88.4	202	248	51.6	Reentered 12/15/76: Tandem test of Merkur
Kosmos 883	1976 122A	USSR	Dec 15	Plesetsk	SL-8	810	104.7	955	1,005	83.0	In orbit: navigation
Kosmos 884	1976 123A	USSR	Dec 17	Tyuratam	SL-4	4,000	89.6	178	346	65.0	Decayed 12/29/76: reconnaissance
Kosmos 885	1976 124A	USSR	Dec 17	Plesetsk	SL-8	900	94.3	467	511	65.8	Decayed 10/14/79: interceptor related
None	1976 125A	US	Dec 19	WTR	Titan IIID	13,300	93.3	342	533	96.9	Reentered 1/28/79
Kosmos 886	1976 126A	USSR	Dec 27	Tyuratam	SL-11	2,000	111.2	489	2,087	65.8	In orbit: ASAT warhead. 60 pieces in orbit
Molniya 3-6	1976 127A	USSR	Dec 28	Plesetsk	SL-6	1,500	699.1	234	39,187	64.1	Domestic communications. Decayed 2/6/90
Kosmos 887	1976 128A	USSR	Dec 28	Plesetsk	SL-8	810	104.7	947	1,012	82.9	In orbit: navigation
Kosmos 888	1977 1A	USSR	Jan 6	Tyuratam	SL-4	4,000	89.5	178	346	65	Reentered 1/9/77: reconnaissance
Meteor 2-2	1977 2A	USSR	Jan 6	Plesetsk	SL-3	2,750	102.8	881	898	81.3	In orbit: weather
Kosmos 889	1977 3A	USSR	Jan 20	Tyuratam	SL-4	4,000	89.8	210	353	71.4	Reentered 2/1/77: reconnaissance
Kosmos 890	1977 4A	USSR	Jan 20	Plesetsk	SL-8	700	105.0	976	1,015	83.0	In orbit: navigation
NATO III B	1977 5A	NATO	Jan 28	ETR	Delta	701	1,436.0	35,779	35,790	5.7	In orbit: NATO communications

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			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Kosmos 891	1977 6A	USSR	Feb 2	Plesetsk	SL-8	900	90.1	276	286	65.8	Decayed 2/4/81: military
None	1977 7A	USAF	Feb 6	ETR	Titan IIIC	820	1436.1	35,776	35,798	2.7	In orbit
Soyuz 24	1977 8A	USSR	Feb 7	Tyuratam	SL-4	6,570	89.4	173	323	51.6	Returned 2/25/77: Viktor Gorbatko, Yuri Glazkov docked with Salyut 5. Mission: 17 days, 17 hrs, 26 mn
Kosmos 892	1977 9A	USSR	Feb 9	Plesetsk	SL-4	4,000	90.4	170	454	72.9	Reentered 2/22/77: reconnaissance
Molniya 2-17	1977 10A	USSR	Feb 11	Plesetsk	SL-6	1,250	717.9	2,250	38,110	63.7	In orbit: domestic communications
Kosmos 893	1977 11A	USSR	Feb 15	Plesetsk	SL-8	550	98.0	306	1,022	73.9	Decayed 10/6/84: scientific
Tansei 3	1977 12A	Japan	Feb 19	Uchinoura	Mu-3H	230	134.1	800	3,803	65.8	In orbit
Kosmos 894	1977 13A	USSR	Feb 21	Plesetsk	SL-8	810	104.8	963	1,010	82.9	In orbit: navigation
Kiku 2	1977 14A	Japan	Feb 23	Tanegashima	N-1	130	1,436.3	35,785	35,791	5.8	In orbit. engineering test satellite
Kosmos 895	1977 15A	USSR	Feb 26	Plesetsk	SL-3	2,500	95.7	545	563	81.2	In orbit: ferret
Kosmos 896	1977 16A	USSR	Mar 3	Plesetsk	SL-4	4,000	88.5	194	216	72.9	Reentered 3/16/77: reconnaissance
Kosmos 897	1977 17A	USSR	Mar 10	Plesetsk	SL-4	4,000	89.7	182	371	72.9	Reentered 3/23/77: reconnaissance
Palapa 2	1977 18A	Indo	Mar 10	ETR	Delta	574	1,435.8	35,750	35,811	8.9	In orbit: Indonesian communications
None	1977 19A	USAF	Mar 13	WTR	Titan IIIB-Agena	3,000	89.3	122	357	96.39	Reentered 5/26/77
Kosmos 898	1977 20A	USSR	Mar 17	Plesetsk	SL-4	4,000	89.0	222	258	81.4	Reentered 3/30/77: reconnaissance
Molniya 1-36	1977 21A	USSR	Mar 24	Plesetsk	SL-6	1,000	717.9	2,196	8,162	63.7	In orbit: domestic communications
Kosmos 899	1977 22A	USSR	Mar 24	Plesetsk	SL-8	900	95.0	500	547	74.0	Decayed 10/19/80: ferret
Kosmos 900	1977 23A	USSR	Mar 29	Plesetsk	SL-8	900	94.2	457	522	82.9	Decayed 10/11/79: scientific
Meteor 1-27	1977 24A	USSR	Apr 5	Plesetsk	SL-3	2,200	102.3	846	892	81.3	In orbit: weather
Kosmos 901	1977 25A	USSR	Apr 5	Plesetsk	SL-7	400	94.4	262	725	70.9	Decayed 6/28/78: military
Kosmos 902	1977 26A	USSR	Apr 7	Plesetsk	SL-4	4,000	89	179	307	81.4	Reentered 4/20/77: reconnaissance
Kosmos 903	1977 27A	USSR	Apr 11	Plesetsk	SL-6	1,250	717.2	4,688	35,639	67.4	In orbit. Exploded 6/8/78, 5 pieces

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 904	1977 28A	USSR	Apr 20	Tyuratam	SL-4	4,000	89.8	210	350	71.4	Reentered 5/4/77: reconnaissance
ESA-GEOS	1977 29A	ESA	Apr 20	ETR	Delta	573	734.1	2,682	38,475	26.6	In orbit: European Space Agency scientific
Kosmos 905	1977 30A	USSR	Apr 26	Plesetsk	SL-4	4,000	89.7	179	366	67.1	Reentered 5/26/77: reconnaissance
Kosmos 906	1977 31A	USSR	Apr 27	Kapustin Yar	SL-8	550	94.3	461	511	50.6	Decayed 3/23/80: scientific
Molniya 3-7	1977 32A	USSR	Apr 28	Plesetsk	SL-6	1,500	717.9	2,235	38,125	63.9	In orbit: domestic communications
Kosmos 907	1977 33A	USSR	May 5	Plesetsk	SL-4	4,000	89.9	187	388	62.8	Reentered 5/16/77: reconnaissance
DSCS II-C7	1977 34A	USAF	May 12	ETR	Titan IIIC	565	1,489.6	36,747	36,907	6.1	In orbit: military communications
DSCS II-C8	1977 34B	USAF	May 12	ETR	Titan IIIC	565	1,436.1	35,776	36,796	6.8	In orbit: military communications
Kosmos 908	1977 35A	USSR	May 17	Tyuratam	SL-4	4,000	89.1	180	307	51.8	Reentered 5/31/77: reconnaissance
Kosmos 909	1977 36A	USSR	May 19	Plesetsk	SL-8	500	117.0	982	2,111	65.9	In orbit: interceptor target
Kosmos 910	1977 37A	USSR	May 23	Tyuratam	SL-11	2,000	91.0	149	506	65.1	Reentered 5/23/77: interceptor
None	1977 38A	USAF	May 23	ETR	Atlas-Agena	700	Current elements not maintained				In orbit
Kosmos 911	1977 39A	USSR	May 25	Plesetsk	SL-8	700	104.7	965	998	82.9	In orbit: navigation
Kosmos 912	1977 40A	USSR	May 26	Plesetsk	SL-4	4,000	89.0	219	257	81.4	Reentered 6/8/77: earth resources
Intelsat IVA F-4	1977 41A	CSC	May 26	ETR	Atlas-Centaur	1,500	1,448.2	35,971	36,072	6.2	In orbit: communications. Decommissioned 8/89. Orbit raised
Kosmos 913	1977 42A	USSR	May 30	Plesetsk	SL-8	550	94.4	471	517	74.0	Decayed 12/29/79: military
Kosmos 914	1977 43A	USSR	May 31	Tyuratam	SL-4	4,000	89.6	210	327	65	Reentered 6/13/77: reconnaissance
DMSP-F2	1977 44A	USAF	Jun 5	WTR	Thor-Burner II	450	101.3	789	853	99.0	In orbit: weather
Kosmos 915	1977 45A	USSR	Jun 8	Plesetsk	SL-4	4,000	89.1	182	306	62.8	Reentered 6/21/77: reconnaissance
Kosmos 916	1977 46A	USSR	Jun 10	Plesetsk	SL-4	4,000	89.9	250	307	62.8	Reentered 6/21/77: reconnaissance
Kosmos 917	1977 47A	USSR	Jun 16	Plesetsk	SL-6	1,250	716.9	5,317	34,992	67.8	In orbit. Exploded 3/30/79, 4 pieces
GOES 2	1977 48A	NOAA	Jun 16	ETR	Delta	627	1,436.3	35,757	35,821	5.8	In orbit: weather
SIGNE 3	1977 49A	France	Jun 17	Kapustin Yar	SL-8	102	94.3	456	515	50.6	Decayed 6/20/79: scientific
Kosmos 918	1977 50A	USSR	Jun 17	Tyuratam	SL-11	2,000	88.4	131	265	65.1	Reentered 6/18/77: interceptor

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 919	1977 51A	USSR	Jun 18	Plesetsk	SL-7	400	95.5	269	882	71.0	Decayed 8/28/78: military
Kosmos 920	1977 52A	USSR	Jun 22	Tyuratam	SL-4	4,000	89.6	180	364	65	Reentered 7/5/77: reconnaissance
NTS-2	1977 53A	Navy	Jun 23	WTR	Atlas F	431	717.9	20,121	20,236	64.0	In orbit: Navigation Technical Satellite; 1st Navstar precursor
Molynia 1-37	1977 54A	USSR	Jun 24	Tyuratam	SL-6	1,000	717.8	964	39,392	63.3	In orbit: domestic communications
Kosmos 921	1977 55A	USSR	Jun 24	Plesetsk	SL-14	5,000	97.6	607	679	75.8	In orbit
None	1977 56A	USAF	Jun 27	WTR	Titan IIID	13,300	88.5	158	250	96.9	Reentered 12/23/77
Meteor 1-28	1977 57A	USSR	Jun 29	Tyuratam	SL-3	2,200	95.9	543	583	97.4	In orbit: weather
Kosmos 922	1977 58A	USSR	Jun 30	Plesetsk	SL-4	4,000	89.5	212	323	62.8	Reentered 7/13/77: reconnaissance
Kosmos 923	1977 59A	USSR	Jul 1	Plesetsk	SL-8	750	100.8	788	809	74.1	In orbit: military communications
Kosmos 924	1977 60A	USSR	Jul 4	Plesetsk	SL-8	900	95.2	513	550	74.0	Decayed 2/10/81: ferret
Kosmos 925	1977 61A	USSR	Jul 7	Plesetsk	SL-3	2,500	95.8	550	566	81.2	In orbit: ferret
Kosmos 926	1977 62A	USSR	Jul 8	Plesetsk	SL-8	810	105.0	967	1,018	82.9	In orbit: navigation
Kosmos 927	1977 63A	USSR	Jul 12	Plesetsk	SL-4	4,000	90	178	403	89.6	Reentered 7/25/77: reconnaissance
Kosmos 928	1977 64A	USSR	Jul 13	Plesetsk	SL-8	810	104.6	949	1,006	83.0	In orbit: navigation
Himawari (GMS-1)	1977 65A	Japan	Jul 14	ETR	Delta	670	1,436.0	35,771	35,801	4.8	In orbit: meteorological. 2nd stage exploded, 93 pieces in orbit
Kosmos 929	1977 66A	USSR	Jul 17	Tyuratam	SL-13	19,000	90.6	301	308	51.5	Reentered 2/2/78: man-related. Capsule down 8/16/77
Kosmos 930	1977 67A	USSR	Jul 19	Plesetsk	SL-8	2,750	94.5	481	512	74.0	Decayed 5/12/80: ferret
Kosmos 931	1977 68A	USSR	Jul 20	Plesetsk	SL-6	1,250	718.8	3,984	36,418	67.9	In orbit. Exploded 10/24/77, 7 pieces
Kosmos 932	1977 69A	USSR	Jul 20	Tyuratam	SL-4	4,000	89.5	180	342	65	Reentered 8/2/77: reconnaissance
Kosmos 933	1977 70A	USSR	Jul 22	Plesetsk	SL-8	900	92.3	372	407	65.8	Decayed 11/1/78: military
Raduga 3	1977 71A	USSR	Jul 23	Tyuratam	SL-12	2,000	1,437.3	35,781	35,841	7.1	In orbit: communications
Kosmos 934	1977 72A	USSR	Jul 27	Plesetsk	SL-4	4,000	89.4	238	264	62.8	Reentered 8/9/77: reconnaissance
Kosmos 935	1977 73A	USSR	Jul 29	Plesetsk	SL-4	4,000	89.2	225	276	81.3	Reentered 8/11/77: reconnaissance

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 936	1977 74A	USSR	Aug 3	Plesetsk	SL-4	4,000	90.7	224	419	62.8	Reentered 8/22/77: biological
Kosmos		USSR	Aug 4	Tyuratam	SL-13						Failed to orbit
HEAO 1	1977 75A	US	Aug 12	ETR	Atlas-Centaur	2,720	93.3	424	444	22.7	Decayed 3/15/79: High Energy Astronomy Observatory, survey X-ray sky
Voyager 2	1977 76A	US	Aug 20	ETR	Titan IIIE-Centaur	800	Solar System Escape Trajectory				Jupiter-Saturn flyby: reached Jupiter 7/9/79; reached Saturn 8/26/81; reached Uranus 1/24/86; Neptune 8/25/89
Kosmos 937	1977 77A	USSR	Aug 24	Tyuratam	SL-11	4,500	93.3	428	444	65.0	Decayed 10/19/78: ocean surveillance-ferret
Kosmos 938	1977 78A	USSR	Aug 24	Plesetsk	SL-4	6,300	89.7	189	365	62.8	Reentered 9/6/77: reconnaissance
Kosmos 939	1977 79A	USSR	Aug 24	Plesetsk	SL-8	40	114.8	1,429	1,461	74.0	In orbit: military commsat
Kosmos 940	1977 79B	USSR	Aug 24	Plesetsk	SL-8	40	114.4	1,391	1,461	74.0	In orbit: military commsat
Kosmos 941	1977 79C	USSR	Aug 24	Plesetsk	SL-8	40	114.6	1,411	1,461	74.0	In orbit: military commsat
Kosmos 942	1977 79D	USSR	Aug 24	Plesetsk	SL-8	40	115.9	1,461	1,530	74.0	In orbit: military commsat
Kosmos 943	1977 79E	USSR	Aug 24	Plesetsk	SL-8	40	115.0	1,448	1,461	74.0	In orbit: military commsat
Kosmos 944	1977 79F	USSR	Aug 24	Plesetsk	SL-8	40	115.2	1,460	1,468	74.0	In orbit: military commsat
Kosmos 945	1977 79G	USSR	Aug 24	Plesetsk	SL-8	40	115.4	1,461	1,488	74.0	In orbit: military commsat
Kosmos 946	1977 79H	USSR	Aug 24	Plesetsk	SL-8	40	115.6	1,461	1,507	74.0	In orbit: military commsat
SIRIO	1977 80A	Italy	Aug 25	ETR	Delta	220	1,436.2	35,773	35,803	0.1	In orbit: experimental commsat
Kosmos 947	1977 81A	USSR	Aug 27	Plesetsk	SL-4	5,900	89.7	211	346	72.8	Reentered 9/9/77: reconnaissance
Molniya 1-38	1977 82A	USSR	Aug 30	Plesetsk	SL-6	1,000	718.0	655	39,709	63.9	In orbit: domestic communications
Kosmos 948	1977 83A	USSR	Sep 2	Plesetsk	SL-4	5,900	89	217	265	89.4	Reentered 9/15/77: earth resources
Voyager 1	1977 84A	US	Sep 5	ETR	Titan IIIE-Centaur	800	Solar System Escape Trajectory				Jupiter-Saturn flyby: reached Jupiter 3/5/79; reached Saturn 11/12/80
Kosmos 949	1977 85A	USSR	Sep 6	Plesetsk	SL-4	6,700	89.5	184	348	62.8	Reentered 10/6/77: reconnaissance
OTS	—	ESA	Sep 13	ETR	Delta	865	—	—	—	—	Destroyed: launch vehicle malfunction
Kosmos 950	1977 86A	USSR	Sep 13	Plesetsk	SL-4	5,700	89.4	213	305	62.8	Reentered 9/27/77: reconnaissance

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 951	1977 87A	USSR	Sep 13	Plesetsk	SL-8	810	104.8	961	1,011	83.0	In orbit: navigation
Kosmos 952	1977 88A	USSR	Sep 16	Tyuratam	SL-11	4,500	104.1	904	999	64.9	In orbit: ocean surveillance
Kosmos 953	1977 89A	USSR	Sep 16	Plesetsk	SL-4	6,300	89.6	188	354	62.8	Reentered 9/29/77: reconnaissance
Kosmos 954	1977 90A	USSR	Sep 18	Tyuratam	SL-11	4,500	89.6	251	264	64.9	Decayed 1/24/78: ocean surveillance
Kosmos 955	1977 91A	USSR	Sep 20	Plesetsk	SL-3	2,500	96.5	586	593	81.2	In orbit: ferret
Ekran	1977 92A	USSR	Sep 20	Tyuratam	SL-12	2,000	1,448.4	33,905	38,150	2.3	In orbit: TV communications
Prognoz 6	1977 93A	USSR	Sep 22	Tyuratam	SL-6	910	5,688	498	197,900	65*	In orbit: scientific
None	1977 94A	USAF	Sep 23	WTR	Titan IIIB-Agena	3,000	89.3	120	363	96.5	Reentered 12/8/77
Kosmos 956	1977 95A	USSR	Sep 24	Plesetsk	SL-14	5,000	92.2	291	475	75.8	Decayed 6/27/82
Interkosmos 17	1977 96A	USSR	Sep 24	Plesetsk	SL-8	550	94.3	467	511	82.9	Decayed 11/8/79: scientific
Intelsat IVA	—	US	Sep 29	ETR	Atlas-Centaur	1,500	—	—	—	—	Destroyed: a launch vehicle malfunction
Salyut 6	1977 97A	USSR	Sep 29	Tyuratam	SL-13	9,000	92.3	380	391	51.6	Reentered 7/29/82: space station
Kosmos 957	1977 98A	USSR	Sep 30	Tyuratam	SL-4	6,300	89.8	172	359	65.0	Reentered 10/13/77: reconnaissance
Soyuz 25	1977 99A	USSR	Oct 9	Tyuratam	SL-4	6,570	88.8	194	240	51.6	Returned 10/11/77: Vladimir Kovalyonok, Valeri Ryumin failed to dock with Salyut 6. Mission ended after 2 days, 46 mn
Kosmos 958	1977 100A	USSR	Oct 11	Plesetsk	SL-4	6,300	90.5	255	375	62.8	Reentered 10/24/77: reconnaissance
None	None	USSR	Oct 14	Tyuratam	SL-12						Failed to orbit
Kosmos 959	1977 101A	USSR	Oct 21	Plesetsk	SL-8	900	94.3	144	834	65.8	Decayed 11/30/77 interceptor target
ISEE 1	1977 102A	ESA	Oct 22	ETR	Delta	340	3,440.5	2,392	135,839	23.0	Decayed 9/26/87. International Sun-Earth Explorer
ISEE 2	1977 102B	ESA	Oct 22	ETR	Delta	166	3,440.5	2,400	135,830	23.0	Decayed 9/26/87. International Sun-Earth Explorer
Kosmos 960	1977 103A	USSR	Oct 25	Plesetsk	SL-8	900	95.1	501	545	74.0	Decayed 10/22/80: ferret
Kosmos 961	1977 104A	USSR	Oct 26	Tyuratam	SL-11	2,000	101.8	269	1,432	66.4	Reentered 10/26/77: interceptor
Molniya 3-8	1977 105A	USSR	Oct 28	Plesetsk	SL-6	1,500	717.5	1,262	39,078	63.9	In orbit: domestic communications (hot line)

*Initial elements

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Transat	1977 106A	Navy	Oct 28	WTR	Scout	94	106.9	1,062	1,101	89.9	In orbit: Navy navigation
Kosmos 962	1977 107A	USSR	Oct 28	Plesetsk	SL-8	700	104.8	962	1,006	83.0	In orbit: navigation
Meteosat 1	1977 108A	ESA	Nov 23	ETR	Delta	697	1,436.2	34,755	36,823	6.1	In orbit: weather
Kosmos 963	1977 109A	USSR	Nov 24	Plesetsk	SL-8	650	109.2	1,175	1,206	82.9	In orbit
Kosmos 964	1977 110A	USSR	Dec 4	Plesetsk	SL-4	6,300	89.8	171	362	72.8	Reentered 12/17/77
Kosmos 965	1977 111A	USSR	Dec 8	Plesetsk	SL-8	550	94.3	465	515	74.0	Decayed 12/16/79
NOSS-2	1977 112A	Navy	Dec 8	WTR	Atlas F	—	Elements not available				In orbit: Navy Ocean Surveillance Satellite
SSU-4	1977 112D	Navy	Dec 8	WTR	Atlas F	—	Elements not available				In orbit
SSU-5	1977 112E	Navy	Dec 8	WTR	Atlas F	—	Elements not available				In orbit
SSU-6	1977 112F	Navy	Dec 8	WTR	Atlas F	—	Elements not available				In orbit
Soyuz 26	1977 113A	USSR	Dec 10	Tyuratam	SL-4	6,570	91.3	332	351	51.5	Returned 1/16/78 with visiting Soyuz 27 cosmonauts. Yuri Romanenko, Georgi Grechko docked with Salyut 6, remained for 96 days, 10 hrs, returned on Soyuz 27
None	1977 114A	USAF	Dec 11	ETR	Atlas-Agena D	700	Current elements not maintained				In orbit
Kosmos 966	1977 115A	USSR	Dec 12	Tyuratam	SL-4	5,700	89.5	204	296	65.0	Reentered 12/24/77
Kosmos 967	1977 116A	USSR	Dec 13	Plesetsk	SL-8	700	104.7	969	993	65.8	In orbit
Meteor 2-3	1977 117A	USSR	Dec 14	Plesetsk	SL-3	2,700	102.3	846	886	81.2	In orbit
Sakura	1977 118A	Japan	Dec 15	ETR	Delta	676	1,455.9	36,161	36,183	5.3	In orbit: Japanese communications
Kosmos 968	1977 119A	USSR	Dec 16	Plesetsk	SL-8	750	100.6	772	801	74.0	In orbit
Kosmos 969	1977 120A	USSR	Dec 20	Plesetsk	SL-4	5,700	89.0	166	306	62.8	Reentered 1/3/78
Kosmos 970	1977 121A	USSR	Dec 21	Tyuratam	SL-11	2,000	105.7	916	1,127	65.9	In orbit. ASAT warhead, 60 pieces
Kosmos 971	1977 122A	USSR	Dec 23	Plesetsk	SL-8	810	104.9	973	1,005	82.9	In orbit
Kosmos 972	1977 123A	USSR	Dec 27	Plesetsk	SL-14	5,000	103.8	711	1,163	75.8	In orbit
Kosmos 973	1977 124A	USSR	Dec 27	Tyuratam	SL-4	5,700	89.8	202	323	71.4	Reentered 1/9/78
Kosmos 974	1978 1A	USSR	Jan 6	Plesetsk	SL-4	6,000	89.8	179	347	62.8	Reentered 1/19/78: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Intelsat IVA F-3	1978 2A	ITSO	Jan 7	ETR	Atlas-Centaur	1,511	1,436.1	35,783	35,790	1.0	In orbit: commerical communications
Soyuz 27	1978 3A	USSR	Jan 10	Tyuratam	SL-4	6,570	91.4	334	353	51.6	Returned 3/16/78 with Soyuz 26 crew. Vladimir Dzhanibekov, Oleg Makarov are 2nd crew to dock with Salyut 6. They return aboard Soyuz 26. 1st Soyuz swap. Flight time: 5 days, 22 hr, 59 mn.
Kosmos 975	1978 4A	USSR	Jan 10	Plesetsk	SL-3	4,000	96.9	601	617	81.2	In orbit: electronic ferret
Kosmos 976	1978 5A	USSR	Jan 10	Plesetsk	SL-8	40	115.1	1,454	1,461	74.0	In orbit: military commsat
Kosmos 977	1978 5B	USSR	Jan 10	Plesetsk	SL-8	40	114.4	1,398	1,461	74.0	In orbit: military commsat
Kosmos 978	1978 5C	USSR	Jan 10	Plesetsk	SL-8	40	114.7	1,417	1,461	74.0	In orbit: military commsat
Kosmos 979	1978 5D	USSR	Jan 10	Plesetsk	SL-8	40	114.9	1,436	1,461	74.0	In orbit: military commsat
Kosmos 980	1978 5E	USSR	Jan 10	Plesetsk	SL-8	40	115.3	1,461	1,474	74.0	In orbit: military commsat
Kosmos 981	1978 5F	USSR	Jan 10	Plesetsk	SL-8	40	115.5	1,461	1,494	74.0	In orbit: military commsat
Kosmos 982	1978 5G	USSR	Jan 10	Plesetsk	SL-8	40	115.7	1,461	1,514	74.0	In orbit: military commsat
Kosmos 983	1978 5H	USSR	Jan 10	Plesetsk	SL-8	40	116.0	1,461	1,536	74.0	In orbit: military commsat
Kosmos 984	1978 6A	USSR	Jan 13	Plesetsk	SL-4	5,500	89.5	204	293	62.8	Reentered 1/26/78: reconnaissance
Kosmos 985	1978 7A	USSR	Jan 17	Plesetsk	SL-8	810	104.6	939	1,015	82.9	In orbit: navigation
Progress 1	1978 8A	USSR	Jan 20	Tyuratam	SL-4	7,020	88.8	179	249	51.6	Reentered 2/8/78: supply craft to Salyut 6
Molniya 3-9	1978 9A	USSR	Jan 24	Plesetsk	SL-6	2,060	717.7	1,267	39,084	64.8	Domestic communications. Decayed 4/24/90
Kosmos 986	1978 10A	USSR	Jan 24	Tyuratam	SL-4	6,000	89.4	172	317	65.0	Reentered 2/7/78: reconnaissance
China 8	1978 11A	PRC	Jan 26	Shuang Cheng Tzu	CZ-2	2,500	90.9	161	479	57.0	Reentered 2/7/78: reconnaissance. Capsule returned 1/30
IUE	1978 12A	US	Jan 26	ETR	Delta	672	1,436.4	28.082	43,503	30.3	In orbit: International Ultraviolet Explorer carrying 45-cm telescope
Kosmos 987	1978 13A	USSR	Jan 31	Plesetsk	SL-4	6,000	89.8	174	351	62.8	Reentered 2/14/78: reconnaissance
Kyokko	1978 14A	Japan	Feb 4	Kagoshima	Mu 3H	103	134.1	636	3,967	65.4	In orbit: scientific; investigating aurorae
Kosmos 988	1978 15A	USSR	Feb 8	Plesetsk	SL-4	5,500	90.7	204	408	72.8	Reentered 2/20/78: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
FltSatCom 1	1978 16A	US	Feb 9	ETR	Atlas-Centaur	1,884	1,436.2	35,783	35,794	5.1	In orbit: military Fleet Satellite Communications
Kosmos 989	1978 17A	USSR	Feb 14	Tyuratam	SL-4	6,000	89.5	169	333	65.1	Reentered 2/28/78: reconnaissance
UME 2	1978 18A	Japan	Feb 16	Tanegashima	N-1	140	107.2	974	1,217	69.4	In orbit: ionospheric sounding
Kosmos 990	1978 19A	USSR	Feb 17	Plesetsk	SL-8	950	100.6	772	800	74.0	In orbit: military communications
NDS 1	1978 20A	US	Feb 22	WTR	Atlas F	450	718.0	19,959	20,403	63.3	In orbit: Navigational Development Satellite (Navstar 1)
None	1978 21A	US	Feb 25	WTR	Titan IIIB-Agena D	700	Current elements not maintained				In orbit
Kosmos 991	1978 22A	USSR	Feb 28	Plesetsk	SL-8	810	104.7	951	1,006	83.0	In orbit: navigation
Soyuz 28	1978 23A	USSR	Mar 2	Tyuratam	SL-4	6,570	89.5	179	325	51.6	Returned 3/10/78: carried Alexei Gubarev, Vladimir Remek to Salyut 6. Remek is 1st Czechoslovakian in space. Flight time: 7 days, 20 hrs, 16mn.
Molniya 1-39	1978 24A	USSR	Mar 2	Plesetsk	SL-6	1,370	717.7	691	39,658	63.8	In orbit: domestic communications
Kosmos 992	1978 25A	USSR	Mar 4	Tyuratam	SL-4	5,500	89.5	211	284	71.3	Reentered 3/17/78: reconnaissance
Landsat 3	1978 26A	US	Mar 5	WTR	Delta	960	103.2	897	919	98.8	In orbit: 3rd operational U.S. earth resources survey. Last stage later exploded, 172 pieces
Amsat-Oscar-8	1978 26B	US	Mar 5	WTR	Delta	27	103.1	897	909	98.8	In orbit: radio satellite for use by radio amateurs
PIX	1978 26C	US	Mar 5	WTR	Delta	350	99.0	906	913	103.2	In orbit. Plasma Interaction Experiment
Kosmos 993	1978 27A	USSR	Mar 10	Plesetsk	SL-4	6,000	89.6	170	342	72.9	Reentered 3/23/78: reconnaissance
Kosmos 994	1978 28A	USSR	Mar 15	Plesetsk	SL-8	920	104.9	971	1,008	82.9	In orbit: navigation
None	1978 29A	US	Mar 16	WTR	Titan IIID	13,300	88.5	160	240	96.4	Reentered 9/11/78
None	1978 29B	US	Mar 16	WTR	Titan IIID	60	Elements not available				In orbit
Kosmos 995	1978 30A	USSR	Mar 17	Plesetsk	SL-4	5,500	89.0	215	235	81.3	Reentered 3/30/78: reconnaissance
DSCS II C9		US	Mar 25	ETR	Titan IIIC	550	—	—	—	—	Destroyed by range safety
DSCS II C10		US	Mar 25	ETR	Titan IIIC	550	—	—	—	—	Destroyed by range safety
Kosmos 996	1978 31A	USSR	Mar 28	Plesetsk	SL-8	810	104.7	949	1,007	82.9	In orbit: navigation

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 997	1978 32A	USSR	Mar 30	Tyuratam	SL-13	700	88.4	230	200	51.6	Reentered 3/30/78: manned precursor, Merkur test
Kosmos 998	1978 32B	USSR	Mar 30	Tyuratam	SL-13	7,000	88.4	230	200	51.6	Reentered 3/30/78: manned precursor, Merkur test
Kosmos 999	1978 33A	USSR	Mar 30	Tyuratam	SL-4	6,000	89.7	170	348	71.4	Reentered 4/12/78: reconnaissance
Kosmos 1000	1978 34A	USSR	Mar 31	Plesetsk	SL-8	810	104.7	956	1,008	82.9	In orbit: navigation
Intelsat IVA F-6	1978 35A	ITSO	Mar 31	ETR	Atlas-Centaur	825.5	1,436.1	35,769	35,860	1.7	In orbit: commercial communications
Kosmos 1001	1978 36A	USSR	Apr 4	Tyuratam	SL-4	7,000	88.8	200	228	51.6	Reentered 4/15/78: manned precursor
Kosmos 1002	1978 37A	USSR	Apr 6	Tyuratam	SL-4	5,500	89.4	206	284	65.1	Reentered 4/19/78: reconnaissance
None	1978 38A	US	Apr 7	ETR	Atlas-Agena D	700	Current elements not maintained				In orbit
YURI	1978 39A	Japan	Apr 7	ETR	Delta	678	1,433.7	33,775	37,702	4.5	In orbit: experimental broadcast communications
Kosmos 1003	1978 40A	USSR	Apr 20	Plesetsk	SL-4	6,000	89.4	178	328	62.8	Reentered 5/4/78: reconnaissance
HCMM	1978 41A	US	Apr 26	WTR	Scout	134	97.1	618	627	97.6	Decayed 12/22/81: heat capacity mapping mission to produce thermal maps of atmosphere
DMSP-F3	1978 42A	US	May 1	WTR	Thor-Burner II	513	101.1	804	817	98.6	In orbit: weather
Kosmos 1004	1978 43A	USSR	May 5	Plesetsk	SL-4	5,500	89.4	205	289	62.8	Reentered 5/18/78: reconnaissance
OTS-2	1978 44A	ESA	May 11	ETR	Delta	865	1,436.3	35,780	35,801	3.1	In orbit: replacement for OTS-A which exploded at launch; communications (Orbital Test Satellite)
Kosmos 1005	1978 45A	USSR	May 12	Plesetsk	SL-3	4,000	96.5	577	599	81.2	In orbit: elint ferret
Kosmos 1006	1978 46A	USSR	May 12	Plesetsk	SL-8	1,120	91.1	322	342	65.8	Decayed 3/14/79: radar calibration
NDS 2	1978 47A	US	May 13	WTR	Atlas F	453	718.0	19,851	20,512	64.6	In orbit: US navigation (Navstar 2)
Kosmos 1007	1978 48A	USSR	May 16	Plesetsk	SL-4	6,000	89.7	168	350	72.8	Reentered 5/29/78: reconnaissance
Kosmos 1008	1978 49A	USSR	May 17	Plesetsk	SL-8	1,080	89.6	248	259	74.0	Decayed 1/8/81: elint ferret
Kosmos 1009	1978 50A	USSR	May 19	Tyuratam	SL-11	2,500	108.9	964	1,384	65.8	Reentered 5/19/78: interception test; target, Kosmos 967
Pioneer 12	1978 51A	US	May 20	ETR	Atlas-Centaur	582	Trans-Venus trajectory				In orbit: 1st of a pair of Venus-bound craft. Successfully placed in Venus orbit. ``Venus orbiter''
Kosmos 1010	1978 52A	USSR	May 23	Plesetsk	SL-4	6,000	88.9	215	229	81.4	Reentered 6/5/78: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1011	1978 53A	USSR	May 23	Plesetsk	SL-8	810	104.7	956	1,008	82.9	In orbit: navigation
Kosmos 1012	1978 54A	USSR	May 25	Plesetsk	SL-4	5,500	89.3	196	288	62.8	Reentered 6/7/78: reconnaissance
Ekran	None	USSR	May 27	Tyuratam	SL-12	—	—	—	—	—	1st stage failure
Molniya 1-40	1978 55A	USSR	Jun 2	Plesetsk	SL-4	1,970	718.0	917	39,446	64.0	In orbit: domestic communications
Kosmos 1013	1978 56A	USSR	Jun 7	Plesetsk	SL-8	40	116.3	1,476	1,552	74.0	In orbit: military commsat
Kosmos 1014	1978 56B	USSR	Jun 7	Plesetsk	SL-8	40	116.1	1,477	1,529	74.0	In orbit: military commsat
Kosmos 1015	1978 56C	USSR	Jun 7	Plesetsk	SL-8	40	115.8	1,472	1,514	74.0	In orbit: military commsat
Kosmos 1016	1978 56D	USSR	Jun 7	Plesetsk	SL-8	40	115.6	1,470	1,495	74.0	In orbit: military commsat
Kosmos 1017	1978 56E	USSR	Jun 7	Plesetsk	SL-8	40	115.4	1,457	1,489	74.0	In orbit: military commsat
Kosmos 1018	1978 56F	USSR	Jun 7	Plesetsk	SL-8	40	115.2	1,441	1,486	74.0	In orbit: military commsat
Kosmos 1019	1978 56G	USSR	Jun 7	Plesetsk	SL-8	40	115.0	1,422	1,486	74.0	In orbit: military commsat
Kosmos 1020	1978 56H	USSR	Jun 7	Plesetsk	SL-8	40	114.8	1,405	1,483	74.0	In orbit: military commsat
Kosmos 1021	1978 57A	USSR	Jun 10	Tyuratam	SL-4	6,000	89.4	172	316	65.0	Reentered 6/23/78: reconnaissance
None	1978 58A	US	Jun 10	ETR	Titan IIIC	820	Current elements not maintained				In orbit
Kosmos 1022	1978 59A	USSR	Jun 12	Plesetsk	SL-4	6,000	89.7	169	348	72.9	Reentered 6/25/78: reconnaissance
None	1978 60A	US	Jun 14	WTR	Titan IIID	13,000	91.5	262	440	96.9	Reentered 8/23/81
Soyuz 29	1978 61A	USSR	Jun 15	Tyuratam	SL-4	6,570	91.0	316	335	51.6	Returned 9/3/78: Vladimir Kovalyonok, Alexander Ivanchenkov docked with Salyut 6. Mission duration 139 days, 14 hrs, 48 mn
GOES 3	1978 62A	US	Jun 16	ETR	Delta	627	1,436.2	35,781	35,795	3.7	In orbit: 3rd geosynchronous weather satellite operated by NOAA
Kosmos 1023	1978 63A	USSR	Jun 21	Plesetsk	SL-8	1,000	100.6	773	797	74.1	In orbit: military communications
SEASAT 1	1978 64A	US	Jun 27	WTR	Atlas-Agena D	2,300	100.5	778	783	108.0	In orbit: experimental ocean survey. Died 10/9. Pieces broke off in 1983, 1985

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Soyuz 30	1978 65A	USSR	Jun 27	Tyuratam	SL-4	6,570	91.2	344	335	51.6	Returned 7/5/78: carried visiting cosmonauts Pyotr Klimuk, Miroslaw Hermaszewski to Salyut 6. 7 days, 22 hrs, 4 mn
Kosmos 1024	1978 66A	USSR	Jun 28	Plesetsk	SL-6	2,030	717.5	4,229	36,112	68.1	In orbit: early warning
Kosmos 1025	1978 67A	USSR	Jun 28	Plesetsk	SL-14	4,375	97.0	603	626	82.5	In orbit: possible ocean surveillance related
Comstar 3	1978 68A	US	Jun 29	ETR	Atlas-Centaur	1,520	1,445.5	35,867	36,034	0.7	In orbit: U.S. domestic telephone communications
Kosmos 1026	1978 69A	USSR	Jul 2	Tyuratam	SL-4	5,500	89.1	207	248	51.8	Reenterad 7/6/78: reconnaissance
Progress 2	1978 70A	USSR	Jul 7	Tyuratam	SL-4	7,020	88.7	182	234	51.6	Reentered 8/4/78: supply craft to Salyut 6
GEOS 2	1978 71A	ESA	Jul 14	ETR	Delta	573	1,449.0	36,014	36,063	6.0	In orbit: magnetospheric research
Molniya 1-41	1978 72A	USSR	Jul 14	Plesetsk	SL-6	1,970	717.9	787	39,571	64.6	In orbit: domestic communications
Raduga 4	1978 73A	USSR	Jul 18	Tyuratam	SL-12	4,000	1,478	35,590	36,590	0.5*	In orbit: communications; Statsionar 2
Kosmos 1027	1978 74A	USSR	Jul 27	Plesetsk	SL-8	920	104.7	958	1,000	82.9	In orbit: navigation
None	None	PRC	Jul 28		FB-1						Failed
None	1978 75A	US	Aug 5	WTR	Titan IIIB-Agena D	700	Elements not available				In orbit: military communications
Kosmos 1028	1978 76A	USSR	Aug 5	Plesetsk	SL-4	6,700	89.9	158	383	67.1	Reentered 9/4/78: reconnaissance
Progress 3	1978 77A	USSR	Aug 7	Tyuratam	SL-4	7,000	88.7	190	232	51.6	Reentered 8/23/78: supply craft to Salyut 6
Pioneer 13	1978 78A	US	Aug 8	ETR	Atlas-Centaur	904	Trans-Venus Trajectory				Decayed 12/9/78: 2nd in a pair of spacecraft to Venus. Five payloads struck Venus as planned 12/9/78. "Multiprobe"
ISEE 3	1978 79A	US	Aug 12	ETR	Delta	479	3,755.0	705,638	878,448	21.7	In orbit: 3rd of three spacecraft measuring interaction between solar wind and earth: renamed International Cometary Explorer; sent on trajectory to meet Comet Giacobini-Zinner. Rendezvoused 9/11/85
Ekran	None	USSR	Aug 17	Tyuratam	SL-12						2nd stage failure
Molniya 1-42	1978 80A	USSR	Aug 22	Plesetsk	SL-6	1,970	717.8	1,184	38,472	64.0	In orbit: domestic communications

*Initial elements

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Soyuz 31	1978 81A	USSR	Aug 26	Tyuratam	SL-4	6,600	91.4	337	353	51.6	Returned 11/2/78: carried Valeri Bykovsky, Sigmund Jahn to Salyut 6. 7 days, 20 hrs, 49 mn
Kosmos 1029	1978 82A	USSR	Aug 29	Plesetsk	SL-4	6,000	89.3	171	310	62.8	Reentered 9/8/78: reconnaissance
Kosmos 1030	1978 83A	USSR	Sep 6	Plesetsk	SL-6	2,030	718.0	3,626	36,740	67.1	In orbit: early warning. Exploded 10/10/78, 7 pieces
Venera 11	1978 84A	USSR	Sep 9	Tyuratam	SL-12	4,940		Heliocentric Orbit			In orbit: Venus exploration craft. Landed on Venus 12/25/78
Kosmos 1031	1978 85A	USSR	Sep 9	Plesetsk	SL-4	6,000	89.5	182	347	62.8	Reentered 9/22/78: reconnaissance
Venera 12	1978 86A	USSR	Sep 14	Tyuratam	SL-12	4,940		Heliocentric Orbit			In orbit: 2nd Venus exploration craft. Landed on Venus 12/21/78
Jiki'ken	1978 87A	Japan	Sep 16	Kagoshima	Mu 3H	100	420.0	277	24,122	31.2	In orbit: Japanese research
Kosmos 1032	1978 88A	USSR	Sep 19	Plesetsk	SL-4	5,500	88.9	215	226	81.3	Reentered 10/2/78: reconnaissance
Kosmos 1033	1978 89A	USSR	Oct 3	Plesetsk	SL-4	6,000	88.9	204	234	81.4	Reentered 10/16/78: reconnaissance
Progress 4	1978 90A	USSR	Oct 3	Tyuratam	SL-4	7,020	88.8	185	248	51.6	Reentered 10/26/78: supply craft to Salyut 6
Kosmos 1034	1978 91A	USSR	Oct 4	Plesetsk	SL-8	40	114.9	1,420	1,480	74.0	In orbit: military commsat
Kosmos 1035	1978 91B	USSR	Oct 4	Plesetsk	SL-8	40	114.7	1,401	1,477	74.0	In orbit: military commsat
Kosmos 1036	1978 91C	USSR	Oct 4	Plesetsk	SL-8	40	115.1	1,440	1,479	74.0	In orbit: military commsat
Kosmos 1037	1978 91D	USSR	Oct 4	Plesetsk	SL-8	40	115.3	1,459	1,480	74.0	In orbit: military commsat
Kosmos 1038	1978 91E	USSR	Oct 4	Plesetsk	SL-8	40	115.6	1,474	1,486	74.0	In orbit: military commsat
Kosmos 1039	1978 91F	USSR	Oct 4	Plesetsk	SL-8	40	116.3	1,477	1,550	74.0	In orbit: military commsat
Kosmos 1040	1978 91G	USSR	Oct 4	Plesetsk	SL-8	40	116.0	1,477	1,525	74.0	In orbit: military commsat
Kosmos 1041	1978 91H	USSR	Oct 4	Plesetsk	SL-8	40	115.8	1,475	1,507	74.0	In orbit: military commsat
Kosmos 1042	1978 92A	USSR	Oct 6	Plesetsk	SL-4	6,000	89.4	180	306	62.8	Reentered 10/19/78: reconnaissance
GPS 3	1978 93A	US	Oct 7	WTR	Atlas F	450	718.0	20,071	20,293	64.2	In orbit: 3rd Global Positioning Satellite (Navstar 3)
Kosmos 1043	1978 94A	USSR	Oct 10	Plesetsk	SL-3	4,000	96.2	571	584	81.2	In orbit: electronic ferret
Molniya 3-10	1978 95A	USSR	Oct 13	Plesetsk	SL-6	2,060	717.9	747	39,613	64.0	In orbit: domestic communications

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Tiros-N	1978 96A	US	Oct 13	WTR	Atlas F	734	101.8	835	853	99.0	In orbit: weather
Kosmos 1044	1978 97A	USSR	Oct 17	Plesetsk	SL-4	5,500	89.5	205	292	62.8	Reentered 10/30/78: reconnaissance
Ekran	None	USSR	Oct 17	Tyuratam	SL-12	—	—	—	—	—	2nd stage failure
Nimbus 7	1978 98A	US	Oct 24	WTR	Delta	907	104.1	944	958	99.3	In orbit: environmental research
Cameo	1978 98B	US	Oct 24	WTR	Delta	350	104.0	927	969	99.4	In orbit: released barium cloud
Interkosmos 18	1978 99A	USSR	Oct 24	Plesetsk	SL-8	1,050	92.0	320	428	82.9	Decayed 3/17/81: scientific
Magion	1978 99C	Czech	Oct 24	Plesetsk	SL-8	15	93.5	356	534	82.9	Decayed 9/11/81: magnetosphere-ionospheric studies
Kosmos 1045	1978 100A	USSR	Oct 26	Plesetsk	SL-14	2,670	120.3	1,682	1,703	82.5	In orbit: probable oceanographic
Radio 1	1978 100B	USSR	Oct 26	Plesetsk	SL-14	40	120.3	1,683	1,705	82.6	In orbit: amateur radio
Radio 2	1978 100C	USSR	Oct 26	Plesetsk	SL-14	40	120.3	1,683	1,704	82.5	In orbit: amateur radio
Prognos 7	1978 101A	USSR	Oct 30	Tyuratam	SL-6	950	5,888	472	202,627	64.9	Decayed 10/22/80: scientific; studying magnetosphere
Kosmos 1046	1978 102A	USSR	Nov 1	Plesetsk	SL-4	5,500	89.6	200	318	72.8	Reentered 11/13/78: reconnaissance
HEAO 2	1978 103A	US	Nov 13	ETR	Atlas-Centaur	3,150	91.7	355	364	23.5	Decayed 3/25/82: 2nd in a series of three High Energy Astronomy Observatories
Kosmos 1047	1978 104A	USSR	Nov 15	Plesetsk	SL-4	6,000	89.7	169	352	72.8	Reentered 11/28/78: reconnaissance
Kosmos 1048	1978 105A	USSR	Nov 16	Plesetsk	SL-8	1,000	100.7	776	806	74.0	In orbit: military communications
NATO III-C	1978 106A	NATO	Nov 19	ETR	Delta	720	1,436.1	35,782	35,792	3.2	In orbit: 3rd NATO satellite
Kosmos 1049	1978 107A	USSR	Nov 21	Plesetsk	SL-4	6,000	89.6	169	341	72.9	Reentered 12/4/78: reconnaissance
Kosmos 1050	1978 108A	USSR	Nov 28	Plesetsk	SL-4	6,000	89.7	254	269	62.8	Reentered 12/12/78: reconnaissance
Kosmos 1051	1978 109A	USSR	Dec 5	Plesetsk	SL-8	40	114.6	1,392	1,485	74.0	In orbit: military commsat
Kosmos 1052	1978 109B	USSR	Dec 5	Plesetsk	SL-8	40	114.8	1,408	1,487	74.0	In orbit: military commsat
Kosmos 1053	1978 109C	USSR	Dec 5	Plesetsk	SL-8	40	115.0	1,427	1,487	74.0	In orbit: military commsat
Kosmos 1054	1978 109D	USSR	Dec 5	Plesetsk	SL-8	40	115.2	1,444	1,488	74.0	In orbit: military commsat
Kosmos 1055	1978 109E	USSR	Dec 5	Plesetsk	SL-8	40	115.5	1,462	1,489	74.0	In orbit: military commsat
Kosmos 1056	1978 109F	USSR	Dec 5	Plesetsk	SL-8	40	115.7	1,470	1,501	74.0	In orbit: military commsat

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1057	1978 109G	USSR	Dec 5	Plesetsk	SL-8	40	115.9	1,479	1,513	74.0	In orbit: military commsat
Kosmos 1058	1978 109H	USSR	Dec 5	Plesetsk	SL-8	40	116.2	1,479	1,535	74.0	In orbit: military communications
Kosmos 1059	1978 110A	USSR	Dec 7	Plesetsk	SL-4	6,000	89.7	179	337	62.8	Reentered 12/20/78: reconnaissance
Kosmos 1060	1978 111A	USSR	Dec 8	Tyuratam	SL-4	5,500	89.5	204	291	65.0	Reentered 12/21/78: reconnaissance satellite
GPS 4	1978 112A	US	Dec 11	WTR	Atlas F	450	718.0	20,050	20,315	63.3	In orbit: 4th in U.S. Global Positioning System (Navstar 4)
DSCS II-C11	1978 113A	US	Dec 14	ETR	Titan IIIC	550	1,436.0	35,779	35,792	4.7	In orbit: military communications
DSCS II-C12	1978 113B	US	Dec 14	ETR	Titan IIIC	550	1,436.4	35,789	35,794	4.6	In orbit: military communications
Kosmos 1061	1978 114A	USSR	Dec 14	Plesetsk	SL-4	5,500	89.4	199	291	62.8	Reentered 12/27/78: reconnaissance
Kosmos 1062	1978 115A	USSR	Dec 15	Plesetsk	SL-8	810	92.4	380	401	74.0	Decayed 4/20/81: elint ferret
Anik B1	1978 116A	Canada	Dec 16	ETR	Delta	900	1,442.7	35,895	35,935	0.3	In orbit: domestic communications
Kosmos 1063	1978 117A	USSR	Dec 19	Plesetsk	SL-3	4,000	96.8	589	594	81.2	In orbit: elint ferret
Gorizont 1	1978 118A	USSR	Dec 19	Tyuratam	SL-12	4,000	1,436.6	20,625	50,969	14.3	In orbit: communications for telephone & TV
Kosmos 1064	1978 119A	USSR	Dec 20	Plesetsk	SL-8	1,025	94.9	382	649	82.9	Navigation; probable failure. Decayed 11/12/89
Kosmos 1065	1978 120A	USSR	Dec 22	Kapustin Yar	SL-8	1,170	93.4	344	543	50.6	Decayed 8/1/79: radar calibration
Kosmos 1066	1978 121A	USSR	Dec 23	Plesetsk	SL-3	3,800	102.1	822	896	81.2	In orbit: weather; probable failure
Kosmos 1067	1978 122A	USSR	Dec 26	Plesetsk	SL-8	880	109.1	1,154	1,211	83.0	In orbit: geodetic
Kosmos 1068	1978 123A	USSR	Dec 26	Plesetsk	SL-4	6,000	89.3	168	319	62.7	Reentered 1/8/79: reconnaissance
Kosmos 1069	1978 124A	USSR	Dec 28	Plesetsk	SL-4	5,500	89.6	239	278	62.8	Reentered 1/10/79: reconnaissance
Kosmos	None	USSR	Jan 5	Tyratam							Dual Kosmos. Failed
Kosmos 1070	1979 1A	USSR	Jan 11	Plesetsk	SL-4	5,500	89.2	204	266	62.8	Reentered 1/20/79: reconnaissance
Kosmos 1071	1979 2A	USSR	Jan 13	Plesetsk	SL-4	6,000	89.7	178	337	62.8	Reentered 1/26/79: reconnaissance
Kosmos 1072	1979 3A	USSR	Jan 16	Plesetsk	SL-8	810	104.8	960	1,013	82.9	In Norbit: navigation
Molniya 3-11	1979 4A	USSR	Jan 18	Plesetsk	SL-6	2,060	717.6	1,496	38,848	64.1	In orbit: domestic communications
Meteor 1-29	1979 5A	USSR	Jan 25	Tyuratam	SL-3	3,800	97.0	581	645	97.6	In orbit: weather; sun-synchronous orbit
Kosmos 1073	1979 6A	USSR	Jan 30	Plesetsk	SL-4	6,000	89.6	181	326	62.8	Reentered 2/12/79: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Scatha	1979 7A	US	Jan 30	ETR	Delta	360	1,416.0	28,205	42,577	4.9	In orbit: joint DoD-NASA technology experiments
Kosmos 1074	1979 8A	USSR	Jan 31	Tyuratam	SL-4	7,000	91.8	354	370	51.6	Reentered 4/1/79: manned precursor
ECS (Ayame)	1979 9A	Japan	Feb 6	Tanegashima	N-1	260	1,314.5	29,194	37,548	0.7	In orbit: Experimental Communications Satellite
Kosmos 1075	1979 10A	USSR	Feb 8	Plesetsk	SL-8	1,080	92.8	393	430	65.8	Decayed 10/19/81: radar calibration
Kosmos 1076	1979 11A	USSR	Feb 12	Plesetsk	SL-14	4,500	96.8	593	620	82.5	In orbit: environmental; studying oceans and associated physical properties
Kosmos 1077	1979 12A	USSR	Feb 13	Plesetsk	SL-3	4,000	96.4	580	590	81.2	In orbit: elint ferret
Sage	1979 13A	US	Feb 18	Wallops Island	Scout	147	94.4	460	521	55.0	Designed to study dust & liquid droplets in upper atmosphere by measuring their filtering effect on sunlight. Decayed 4/11/89
Hakucho	1979 14A	Japan	Feb 21	Kagoshima	Mu-3C	100	94.3	473	494	29.9	Decayed 4/15/85: scientific; studied soft X-ray region of the spectrum
Ekran 3	1979 15A	USSR	Feb 21	Tyuratam	SL-12	4,000	1,435.5	35,624	35,924	6.2	In orbit: TV relay; Statsionar 1
Kosmos 1078	1979 16A	USSR	Feb 22	Plesetsk	SL-4	6,000	88.4	168	280	72.9	Reentered 3/2/79: reconnaissance
Solwind P78-1	1979 17A	US	Feb 24	WTR	Atlas	1,331	95.2	513	547	97.8	In orbit: research; (ionosphere & magnetosphere). Hit by USAF ASAT 9/13/85, 163 pieces
Soyuz 32	1979 18A	USSR	Feb 25	Tyuratam	SL-4	6,600	90.7	298	326	51.6	Returned 6/13/79: ferried Vladimir Lyakhov, Valeri Ryumin to Salyut 6. 175 days, 36 mn
Kosmos 1079	1979 19A	USSR	Feb 27	Plesetak	SL-4	6,700	89.2	174	337	67.1	Reentered 3/11/79: reconnaissance
Interkosmos 19	1979 20A	USSR	Feb 27	Plesetsk	SL-8	1,015	98.3	483	874	74.0	In orbit: scientific
Meteor 2-4	1979 21A	USSR	Mar 1	Plesetsk	SL-3	3,800	102.1	845	872	81.2	In orbit: weather
Progress 5	1979 22A	USSR	Mar 12	Tyuratam	SL-4	7,020	88.8	183	256	51.6	Reentered 4/5/79: supply craft to Salyut 6
Kosmos 1080	1979 23A	USSR	Mar 14	Plesetsk	SL-4	6,000	89.0	168	283	72.8	Reentered 3/28/79: reconnaissance
Kosmos 1081	1979 24A	USSR	Mar 15	Plesetsk	SL-8	40	114.5	1,401	1,464	75.0	In orbit: military commsat
Kosmos 1082	1979 24B	USSR	Mar 15	Plesetsk	SL-8	40	114.7	1,422	1,463	74.0	In orbit: military commsat
Kosmos 1083	1979 24C	USSR	Mar 15	Plesetsk	SL-8	40	114.9	1,440	1,464	74.0	In orbit: military commsat

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 1084	1979 24D	USSR	Mar 15	Plesetsk	SL-8	40	115.2	1,461	1,463	74.0	In orbit: military commsat
Kosmos 1085	1979 24E	USSR	Mar 15	Plesetsk	SL-8	40	115.6	1,463	1,503	74.0	In orbit: military commsat
Kosmos 1086	1979 24F	USSR	Mar 15	Plesetsk	SL-8	40	115.4	1,463	1,481	74.0	In orbit: military commsat
Kosmos 1087	1979 24G	USSR	Mar 15	Plesetsk	SL-8	40	115.8	1,463	1,523	74.0	In orbit: military commsat
Kosmos 1088	1979 24H	USSR	Mar 15	Plesetsk	SL-8	40	116.1	1,463	1,546	74.0	In orbit: military commsat
None	1979 25A	US	Mar 16	WTR	Titan IIID	13,300	88.8	170	258	96.4	Reentered 9/22/79
None	1979 25B	US	Mar 16	WTR	Titan IIID	60	Elements not available				In orbit
Kosmos 1089	1979 26A	USSR	Mar 21	Plesetsk	SL-8	810	104.8	965	1,000	83.0	In orbit: navigation
Kosmos 1090	1979 27A	USSR	Mar 31	Plesetsk	SL-4	5,500	89.8	201	329	72.9	Reentered 4/13/79: reconnaissance
Kosmos 1091	1979 28A	USSR	Apr 7	Plesetsk	SL-8	810	104.8	961	1,008	82.9	In orbit: navigation
Soyuz 33	1979 29A	USSR	Apr 10	Tyuratam	SL-4	6,000	89.0	194	261	51.6	Returned 4/12/79: Nikolai Rukavishnikov, Georgi Ivanov failed to dock with Salyut 6. Flight time: 1 day, 23 hr, 1mn.
Kosmos 1092	1979 30A	USSR	Apr 11	Plesetsk	SL-8	810	104.8	960	1,005	82.9	In orbit: navigation
Molniya 1-43	1979 31A	USSR	Apr 12	Plesetsk	SL-6	1,970	717.6	1,549	38,802	64.9	Domestic communications. Decayed 12/9/89
Kosmos 1093	1979 32A	USSR	Apr 14	Plesetsk	SL-3	4,000	96.3	575	584	81.2	In orbit: elint ferret
Kosmos 1094	1979 33A	USSR	Apr 18	Tyuratam	SL-11	4,000	93.3	427	446	65.0	Decayed 11/7/79: ocean reconnaissance. Exploded 9/17/79, 23 pieces.
Kosmos 1095	1979 34A	USSR	Apr 20	Plesetsk	SL-4	6,000	92.2	354	419	72.8	Reentered 5/1/79: reconnaissance
Raduga	1979 35A	USSR	Apr 25	Tyuratam	SL-12	4,000	1,436.3	35,755	35,824	1.7	In orbit: comsat—Statsionar 1
Kosmos 1096	1979 36A	USSR	Apr 25	Tyuratam	SL-11	4,000	93.2	429	443	65.0	Decayed 11/24/79: ocean reconnaissance
Kosmos 1097	1979 37A	USSR	Apr 27	Plesetsk	SL-4	6,700	89.3	171	316	62.7	Reentered 5/27/79: reconnaissance
FltSatCom 2	1979 38A	US	May 4	ETR	Atlas-Centaur	1,884	1,436.1	35,735	35,837	4.7	In orbit: military communications
Progress 6	1979 39A	USSR	May 13	Tyuratam	SL-4	7,020	88.9	190	247	51.6	Reentered 6/9/79 unmanned supply craft to Salyut
Kosmos 1098	1979 40A	USSR	May 15	Plesetsk	SL-4	6,000	89.8	169	356	72.9	Reentered 5/28/79: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1099	1979 41A	USSR	May 17	Plesetsk	SL-4	5,500	89.0	214	244	81.3	Reentered 5/30/79: reconnaissance
Kosmos 1100	1979 42A	USSR	May 22	Tyuratam	SL-13	9,000	88.7	193	223	51.6	Reentered 5/23/79: manned precursor, Merkur test
Kosmos 1101	1979 42B	USSR	May 22	Tyuratam	SL-13	9,000	88.7	193	223	51.6	Reentered 5/23/79, tandem Merkur test
Firewheel		ESA	Mar 23	Kourou	Ariane						Launch failuire
Kosmos 1102	1979 43A	USSR	May 25	Plesetsk	SL-4	5,500	89.1	212	251	81.3	Reentered 6/7/79: reconnaissance
None	1979 44A	US	May 28	WTR	Titan IIIB-Agena	4,000	88.6	131	285	96.4	Reentered 8/26/79
Kosmos 1103	1979 45A	USSR	May 31	Plesetsk	SL-4	6,000	90.1	210	344	62.7	Reentered 6/14/79: reconnaissance
Kosmos 1104	1979 46A	USSR	May 31	Plesetsk	SL-8	810	104.7	956	1,005	82.9	In orbit: navigation
UK Ariel 6	1979 47A	UK	Jun 2	WI	Scout D	154	95.6	533	562	55.0	Scientific. Decayed 9/23/90
Molniya 3-12	1979 48A	USSR	Jun 5	Plesetsk	SL-6	2,060	717.9	1,569	38,791	64.1	In orbit: domestic communications
Soyuz 34	1979 49A	USSR	Jun 6	Tyuratam	SL-4	6,800	92.5	395	405	51.6	Launched unmanned; returned with Salyut 6 crew 8/19/79
DMSP F-4	1979 50A	US	Jun 6	WTR	Thor-Burner II	513	101.2	806	828	98.7	In orbit: defense meteorology
Bhaskara	1979 51A	India	Jun 7	Kapustin Yar	SL-8	441	92.8	407	412	50.7	Earth resources. Decayed 2/17/89
Kosmos 1105	1979 52A	USSR	Jun 8	Plesetsk	SL-4	5,500	89.1	210	246	81.3	Reentered 6/21/79: reconnaissance
None	1979 53A	US	Jun 10	ETR	Titan IIIC	820	Current elements not maintained				In orbit
Kosmos 1106	1979 54A	USSR	Jun 12	Plesetsk	SL-4	5,500	89.0	214	235	81.4	Reentered 6/15/79: reconnaissance
Kosmos 1107	1979 55A	USSR	Jun 15	Plesetsk	SL-4	6,000	89.5	197	302	72.9	Recovered 6/29/79: reconnaissance
Kosmos 1108	1979 56A	USSR	Jun 22	Plesetsk	SL-4	5,500	89.1	214	245	81.3	Reentered 7/5/79: reconnaissance
NOAA 6	1979 57A	US	Jun 27	WTR	Atlas F	723	101.0	797	813	98.5	In orbit: meteorological
Kosmos 1109	1979 58A	USSR	Jun 27	Plesetsk	SL-6	2,030	718.5	712	39,679	62.9*	In orbit: early warning. Exploded 9/79, 9 pieces
Progress 7	1979 59A	USSR	Jun 28	Tyuratam	SL-4	1,020	92.5	395	405	51.6	Reentered 7/20/79: Salyut 6 supply craft
Kosmos 1110	1979 60A	USSR	Jun 28	Plesetsk	SL-8	1,000	100.7	782	804	74.0	In orbit: military communications

*Initial elements

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1111	1979 61A	USSR	Jun 29	Plesetsk	SL-4	6,000	90.8	255	373	62.8	Reentered 7/14/79: reconnaissance
Gorizont 2	1979 62A	USSR	Jul 5	Tyuratam	SL-12	4,000	1,526.5	37,397	37,680	5.5	In orbit: communications—Statsionar 4
Kosmos 1112	1979 63A	USSR	Jul 6	Kapustin Yar	SL-8	1,190	90.6	269	341	50.7	Decayed 1/21/80: radar calibration
Kosmos 1113	1979 64A	USSR	Jul 10	Plesetsk	SL-4	6,000	89.4	171	318	65.0	Reentered 7/23/79: reconnaissance
Kosmos 1114	1979 65A	USSR	Jul 11	Plesetsk	SL-8	1,080	93.9	452	473	74.0	Decayed 12/26/81: elint ferret
Kosmos 1115	1979 66A	USSR	Jul 13	Plesetsk	SL-4	5,500	88.8	204	228	81.3	Reentered 7/26/79: reconnaissance
Kosmos 1116	1979 67A	USSR	Jul 20	Plesetsk	SL-3	4,000	95.9	541	581	81.2	In orbit: elint ferret
Kosmos 1117	1979 68A	USSR	Jul 25	Plesetsk	SL-4	6,000	89.5	177	325	62.8	Reentered 8/7/79: reconnaissance
Kosmos 1118	1979 69A	USSR	Jul 27	Plesetsk	SL-4	5,500	88.9	210	237	81.3	Reentered 8/9/79: reconnaissance
China		PRC	Jul 30	Shuang Cheng Tzu	FB-1	3,600	—	—	—	—	Failed to orbit
Molniya 1-44	1979 70A	USSR	Jul 31	Plesetsk	SL-6	1,970	717.7	1,130	39,219	64.2	In orbit: domestic communications
Kosmos 1119	1979 71A	USSR	Aug 3	Plesetsk	SL-4	5,500	89.0	219	231	81.3	Reentered 8/18/79: reconnaissance
Westar 3	1979 72A	US	Aug 10	ETR	Delta	572	1,436.1	35,777	35,794	0.1	In orbit: U.S. communications, owned by Western Union
Rohini	—	India	Aug 10	Sriharikota	SLV-3	30	—	—	—	—	Failed to reach orbit
Kosmos 1120	1979 73A	USSR	Aug 11	Plesetsk	SL-4	6,000	89.8	174	353	70.4	Reentered 8/24/79: reconnaissance
Kosmos 1121	1979 74A	USSR	Aug 14	Plesetsk	SL-4	6,700	89.6	185	361	67.2	Reentered 9/13/79: reconnaissance
Kosmos 1122	1979 75A	USSR	Aug 17	Plesetsk	SL-4	5,500	88.9	208	227	81.3	Reentered 8/30/79: reconnaissance; carried earth resources package
Kosmos 1123	1979 76A	USSR	Aug 21	Plesetsk	SL-4	5,500	88.9	211	236	81.3	Reentered 9/3/79: reconnaissance
Kosmos 1124	1979 77A	USSR	Aug 28	Plesetsk	SL-6	2,030	717.0	3,602	36,715	68.0	In orbit: early warning. Exploded 9/9/79, 8 pieces
Kosmos 1125	1979 78A	USSR	Aug 28	Plesetsk	SL-8	1,000	100.8	786	804	74.0	In orbit: military communications
Kosmos 1126	1979 79A	USSR	Aug 31	Plesetsk	SL-4	6,000	90.4	194	391	72.8	Reentered 9/14/79: reconnaissance
Kosmos 1127	1979 80A	USSR	Sep 5	Plesetsk	SL-4	6,000	89.4	213	271	81.3	Reentered 9/18/79: reconnaissance
Kosmos 1128	1979 81A	USSR	Sep 14	Plesetsk	SL-4	6,000	89.6	174	330	62.8	Reentered 9/27/79: reconnaissance

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
HEAO 3	1979 82A	US	Sep 20	ETR	Atlas-Centaur	3,150	93.4	424	457	43.6	Decayed 12/7/81: final HEAO, measuring cosmic rays, gamma rays
Kosmos 1129	1979 83A	USSR	Sep 25	Plesetsk	SL-4	6,000	90.4	213	376	62.8	Reentered 10/14/79: biological, experiments in radiation medicine, development of embryos in zero-g
Kosmos 1130	1979 84A	USSR	Sep 25	Plesetsk	SL-8	60	114.6	1,395	1,479	74.0	In orbit: military communications
Kosmos 1131	1979 84B	USSR	Sep 25	Plesetsk	SL-8	40	114.8	1,409	1,481	74.0	In orbit: military communications
Kosmos 1132	1979 84C	USSR	Sep 25	Plesetsk	SL-8	40	114.9	1,423	1,480	74.0	In orbit: military communications
Kosmos 1133	1979 84D	USSR	Sep 25	Plesetsk	SL-8	40	115.1	1,437	1,481	74.0	In orbit: military communications
Kosmos 1134	1979 84E	USSR	Sep 25	Plesetsk	SL-8	40	115.3	1,452	1,481	74.0	In orbit: military communications
Kosmos 1135	1979 84F	USSR	Sep 25	Plesetsk	SL-8	40	115.4	1,460	1,490	74.0	In orbit: military communications
Kosmos 1136	1979 84G	USSR	Sep 25	Plesetsk	SL-8	40	115.6	1,471	1,494	74.0	In orbit: military communications
Kosmos 1137	1979 84H	USSR	Sep 25	Plesetsk	SL-8	40	115.8	1,471	1,512	74.0	In orbit: military communications
Kosmos 1138	1979 85A	USSR	Sep 28	Plesetsk	SL-4	6,000	90.1	195	406	72.8	Reentered 10/11/79: reconnaissance
None	1979 86A	US	Oct 1	ETR	Titan IIIC	820	Current elements not maintained				In orbit
Ekran 4	1979 87A	USSR	Oct 3	Tyuratam	SL-12	4,000	1,436.5	34,778	36,810	1.0	In orbit: domestic TV relay, Statsionar T
Kosmos 1139	1979 88A	USSR	Oct 5	Plesetsk	SL-4	5,500	89.8	201	329	72.9	Reentered 10/18/79: reconnaissance
Kosmos 1140	1979 89A	USSR	Oct 11	Plesetsk	SL-8	1,000	100.6	773	796	74.1	In orbit: military communications
Kosmos 1141	1979 90A	USSR	Oct 16	Plesetsk	SL-8	810	104.6	955	997	83.0	In orbit: navigation
Molniya 1-45	1979 91A	USSR	Oct 20	Plesetsk	SL-6	1,970	717.9	1,776	38,581	64.7	In orbit: domestic communications
Kosmos 1142	1979 92A	USSR	Oct 22	Plesetsk	SL-4	6,000	92.2	349	413	72.9	Reentered 11/4/79: reconnaissance
Kosmos 1143	1979 93A	USSR	Oct 26	Plesetsk	SL-3	4,000	97.0	593	611	81.2	In orbit: elint ferret
MAGSAT	1979 94A	US	Oct 30	WTR	Scout G	181	93.1	341	510	96.8	Decayed 6/11/80: NASA scientific; designed to measure the near-earth magnetic field & crustal anomalies
Meteor 2-5	1979 95A	USSR	Oct 31	Plesetsk	SL-3	3,800	102.5	866	882	81.2	In orbit: weather
Interkosmos 20	1979 96A	USSR	Nov 1	Plesetsk	SL-8	1,100	91.6	343	363	74.0	Decayed 3/5/81: scientific

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1144	1979 97A	USSR	Nov 2	Plesetsk	SL-4	6,700	89.4	158	337	67.1	Reentered 12/4/79: reconnaissance
DSCS II-D13	1979 98A	US	Nov 21	ETR	Titan IIIC	611.5	1,436.3	35,787	35,791	4.1	In orbit: defense communications
DSCS II-D14	1979 98B	US	Nov 21	ETR	Titan IIIC	611.5	1,436.0	35,778	35,790	4.2	In orbit: defense communications
Kosmos 1145	1979 99A	USSR	Nov 27	Plesetsk	SL-3	4,000	96.8	586	594	81.2	In orbit: elint ferret
Kosmos 1146	1979 100A	USSR	Dec 5	Plesetsk	SL-8	1,000	92.9	408	428	65.9	Decayed 11/25/81: radar calibration
SATCOM 3	1979 101A	US	Dec 7	ETR	Delta	463	788.9	8,289	35,519	10.5	In orbit: communication ceased after firing AKM
Kosmos 1147	1979 102A	USSR	Dec 12	Plesetsk	SL-4	6,000	90.3	195	380	72.9	Reentered 12/26/79: reconnaissance
Soyuz T	1979 103A	USSR	Dec 16	Tyuratam	SL-4	7,000	92.0	364	376	51.6	Reentered 3/25/80: flown unmanned; new generation manned transport, docked with Salyut 6
CAT	1979 104A	ESA	Dec 24	Kourou	Ariane	1,602	374.9	178	21,510	17.8	Vehicle test. 3rd stage exploded 3/1/80, 25 pieces in orbit. Decayed 11/27/89
Gorizont 3	1979 105A	USSR	Dec 28	Tyuratam	SL-12	4,000	1,435.9	35,772	35,794	5.2	In orbit: communications
Kosmos 1148	1979 106A	USSR	Dec 28	Plesetsk	SL-4	6,000	89.5	167	327	67.1	Reentered 1/10/80: reconnaissance
Kosmos 1149	1980 1A	USSR	Jan 9	Plesetsk	SL-4	6,300	92.3	353	418	72.9	Reentered 1/23/80: military reconnaissance
Molniya 1-46	1980 2A	USSR	Jan 11	Plesetsk	SL-6	1,000	717.8	1,429	38,928	64.1	In orbit: domestic communications
Kosmos 1150	1980 3A	USSR	Jan 14	Plesetsk	SL-8	810	104.9	963	1,013	83.0	In orbit: navigation
FltSatCom 3	1980 4A	US	Jan 18	ETR	Atlas-Centaur	1,884	1,436.3	35,771	35,810	4.3	In orbit: military communications
Kosmos 1151	1980 5A	USSR	Jan 23	Plesetsk	SL-14	6,320	97.2	613	640	82.5	In orbit: ocean survey
Kosmos 1152	1980 6A	USSR	Jan 24	Plesetsk	SL-4	6,700	89.4	144	346	67.2	Reentered 2/6/80: military recon/ surveillance
Kosmos 1153	1980 7A	USSR	Jan 25	Plesetsk	SL-8	810	104.9	960	1,016	82.9	In orbit: navigation
Kosmos 1154	1980 8A	USSR	Jan 30	Plesetsk	SL-3	3,800	97.1	612	624	81.2	In orbit: elint (electronic intelligence)
Kosmos 1155	1980 9A	USSR	Feb 7	Plesetsk	SL-4	6,300	92.3	355	414	72.8	Reentered 2/21/80: military recon/ surveillance
None	1980 10A	US	Feb 7	WTR	Titan IIID	13,300	92.5	361	429	96.9	Decayed 10/30/82
GPS (Navstar 5)	1980 11A	US	Feb 9	WTR	Atlas F	433	717.9	19,976	20,386	63.8	In orbit: navigation; part of Global Positioning System
Kosmos 1156	1980 12A	USSR	Feb 11	Plesetsk	SL-8	40	114.5	1,396	1,472	74.0	In orbit: Naval communications

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			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 1157	1980 12B	USSR	Feb 11	Plesetsk	SL-8	40	114.8	1,413	1,475	74.0	In orbit: Naval communications
Kosmos 1158	1980 12C	USSR	Feb 11	Plesetsk	SL-8	40	115.0	1,431	1,475	74.0	In orbit: Naval communications
Kosmos 1159	1980 12D	USSR	Feb 11	Plesetsk	SL-8	40	115.2	1,448	1,477	74.0	In orbit: Naval communications
Kosmos 1160	1980 12E	USSR	Feb 11	Plesetsk	SL-8	40	115.4	1,463	1,482	74.0	In orbit: Naval communications
Kosmos 1161	1980 12F	USSR	Feb 11	Plesetsk	SL-8	40	115.6	1,465	1,502	74.0	In orbit: Naval communications
Kosmos 1162	1980 12G	USSR	Feb 11	Plesetsk	SL-8	40	115.8	1,470	1,517	74.0	In orbit: Naval communications
Kosmos 1163	1980 12H	USSR	Feb 11	Plesetsk	SL-8	40	116.1	1,469	1,541	74.0	In orbit: Naval communications
Kosmos 1164	1980 13A	USSR	Feb 12	Plesetsk	SL-6	1,890	92.3	212	570	62.8	Decayed 1/12/81: early warning; possible failure of Molniya communications. Note: strong suspicion that NORAD never found in high orbit listed. Misidentified part of another flight.
SMM	1980 14A	US	Feb 14	ETR	Delta	2,315	94.4	488	493	28.5	Solar Maximum Mission; launched by NASA to observe the sun. Scientific; repaired on orbit by STS 41-C crew 4/9/84. Decayed 12/2/89
Tansei 4	1980 15A	Japan	Feb 17	Kagoshima	Mu 3S	134	94.3	455	510	38.7	Decayed 5/12/83: scientific
Raduga 6	1980 16A	USSR	Feb 20	Tyuratam	SL-12	2,500	1,435.9	35,778	35,770	5.4	In orbit: communications
Kosmos 1165	1980 17A	USSR	Feb 21	Plesetsk	SL-4	6,300	89.7	170	350	72.8	Reentered 3/5/80: military reconnaissance
Ayame 2	1980 18A	Japan	Feb 22	Tanega-shima	N-1	260	1411.9	33,333	37,289	1.0	In orbit: (ECS-2)
NOSS 3	1980 19A	US	Mar 3	WTR	Atlas F	—	107.4	1,084	1,132	63.5	In orbit
SSU	1980 19C	US	Mar 3	WTR	Atlas F	—	Elements not available				In orbit
SSU	1981 19G	US	Mar 3	WTR	Atlas F	—	Elements not available				In orbit
Kosmos 1166	1980 20A	USSR	Mar 4	Plesetsk	SL-4	6,300	92.4	356	430	72.8	Reentered 3/18/80: military recon/surveillance
Kosmos 1167	1980 21A	USSR	Mar 14	Tyuratam	SL-11	4,150	93.3	425	442	65.0	Decayed 10/1/81: military; EORSAT (elint ocean reconnaissance). Exploded 7/15/81, 13 pieces
Kosmos 1168	1980 22A	USSR	Mar 17	Plesetsk	SL-8	810	104.8	958	1,009	82.9	In orbit: navigation

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1169	1980 23A	USSR	Mar 27	Plesetsk	SL-8	900	93.0	403	435	65.8	Decayed 3/3/83: interception test radar calibration
Progress 8	1980 24A	USSR	Mar 27	Tyuratam	SL-4	7,020	90.6	230	242	51.6	Reentered 4/26/80. unmanned supply vehicle to Salyut 6
Kosmos 1170	1980 25A	USSR	Apr 1	Tyuratam	SL-4	6,300	89.5	174	336	70.3	Reentered 4/12/80: military recon/surveillance
Kosmos 1171	1980 26A	USSR	Apr 3	Plesetsk	SL-8	750	104.8	969	1,002	65.8	In orbit: target for Kosmos 1174
Soyuz 35	1980 27A	USSR	Apr 9	Tyuratam	SL-4	6,570	88.8	197	247	51.6	Ferried Leonid Popov, Valeri Ryumin to Salyut 6. Crew returned on Soyuz 37. Soyuz 35 returned Soyuz 36 crew 6/3/80. Flight time: 184 days, 20 hr, 12 mn.
Kosmos 1172	1980 28A	USSR	Apr 12	Plesetsk	SL-6	1,800	717.5	3,622	36,718	66.2	In orbit: early warning
Kosmos 1173	1980 29A	USSR	Apr 17	Tyuratam	SL-4	6,300	89.6	155	355	70.3	Reentered 4/28/80: military recon/surveillance
Kosmos 1174	1980 30A	USSR	Apr 18	Tyuratam	SL-11	3,320	105.0	378	1,559	66.1	In orbit: interception test using Kosmos 1171 as its primary target. 25 pieces in orbit
Kosmos 1175	1980 31A	USSR	Apr 18	Plesetsk	SL-6	1,890	91.6	252	459	62.8	Decayed 5/28/80: probably failed early warning
GPS 6 (Navstar 6)	1980 32A	US	Apr 26	WTR	Atlas F	450	718.0	19,867	20,497	63.2	In orbit: navigation; (part of Global Positioning System). Failed 12/90
Progress 9	1980 33A	USSR	Apr 27	Tyuratam	SL-4	7,020	90.4	244	350	51.6	Reentered 5/22/80: unmanned ferry carrying supplies to crew of Salyut 6
Kosmos 1176	1980 34A	USSR	Apr 29	Tyuratam	SL-11	4,450	103.4	873	964	64.8	In orbit: radar-carrying ocean survey to Kosmos 954 (nuclear)
Kosmos 1177	1980 35A	USSR	Apr 29	Plesetsk	SL-4	6,700	89.6	165	341	67.1	Reentered 6/12/80: maneuverable reconnaissance
Kosmos 1178	1980 36A	USSR	May 7	Plesetsk	SL-4	6,300	92.2	354	413	72.8	Reentered 5/22/80: military recon/surveillance
Kosmos 1179	1980 37A	USSR	May 14	Plesetsk	SL-8	650	96.5	278	906	82.9	Navigation (failure). Decayed 7/18/89
Kosmos 1180	1980 38A	USSR	May 15	Plesetsk	SL-4	5,900	89.8	238	290	62.8	Reentered 5/26/80: civil; geophysics
Kosmos 1181	1980 39A	USSR	May 20	Plesetsk	SL-8	810	104.8	969	1,004	82.9	In orbit: military; navigation
Kosmos 1182	1980 40A	USSR	May 23	Plesetsk	SL-4	7,420	89.1	210	250	82.3	Reentered 6/5/80: military recon/surveillance, also earth resources

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Firewheel/ Oscar 9	None	ESA	May 23	Kourou	Ariane 1						Failed
Soyuz 36	1980 41A	USSR	May 26	Tyuratam	SL-4	6,570	90.1	250	314	51.6	Carried Valeri Kubasov, Bertalan Farkas to Salyut 6. Crew returned on Soyuz 35. Soyuz 36 returned Soyuz 37 crew, 7/30/80. Flight time: 7 days, 20 hr, 46 mn
Kosmos 1183	1980 42A	USSR	May 28	Plesetsk	SL-4	6,300	92.5	377	418	72.9	Reentered 6/11/80: military recon/surveillance
NOAA B (7)	1980 43A	US	May 29	WTR	Atlas F	1,405	97.5	250	1,028	92.2	Decayed 5/3/81: meteorological; attained unusable orbit
Kosmos 1184	1980 44A	USSR	Jun 4	Plesetsk	SL-3	3,800	96.8	613	593	81.2	In orbit: electronic ferret; military (elint)
Soyuz T 2	1980 45A	USSR	Jun 5	Tyuratam	SL-4	7,000	90.2	266	315	51.6	Returned 6/9/80: test flight of modified Soyuz; Yuri Malyshev, Vladimir Aksyonov docked with Salyut 6, 6/6. Flight time: 3 days, 22 hr, 19 mn
Kosmos 1185	1980 46A	USSR	Jun 6	Plesetsk	SL-4	7,420	89.9	259	283	82.4	Reentered 6/20/80: military recon/surveillance, also earth resources
Kosmos 1186	1980 47A	USSR	Jun 6	Plesetsk	SL-8	900	87.1	123	134	74.0	Decayed 1/1/82: radar calibration
Kosmos 1187	1980 48A	USSR	Jun 12	Plesetsk	SL-4	6,300	89.7	225	289	72.8	Reentered 6/28/80: military recon/surveillance
Gorizont 4	1980 49A	USSR	Jun 14	Tyuratam	SL-12	2,880	1,436.2	35,759	35,817	5.0	In orbit: civil communications
Kosmos 1188	1980 50A	USSR	Jun 14	Plesetsk	SL-6	1,800	718.3	3,303	37,817	67.5	In orbit: early warning
Meteor 1-30	1980 51A	USSR	Jun 18	Tyuratam	SL-3	3,475	96.1	540	600	97.7	In orbit: combined meteorological & earth resources
None	1980 52A	US	Jun 18	WTR	Titan IIID	13,300	89.1	227	236	96.4	Decayed 3/6/81
Molniya 1-47	1980 53A	USSR	Jun 21	Plesetsk	SL-6	1,750	717.7	1,962	38,390	64.8	Domestic communications. Decayed 4/1/91
Kosmos 1189	1980 54A	USSR	Jun 26	Plesetsk	SL-4	6,300	89.7	225	290	72.8	Reentered 7/10/80: military recon/surveillance
Progress 10	1980 55A	USSR	Jun 29	Tyuratam	SL-4	7,020	89.0	206	255	51.6	Reentered 7/19/80: unmanned ferry carrying supplies to Salyut 6
Kosmos 1190	1980 56A	USSR	Jul 1	Plesetsk	SL-8	750	100.7	785	800	74.0	In orbit: military store-dump communications
Kosmos 1191	1980 57A	USSR	Jul 2	Plesetsk	SL-6	1,800	718.4	617	39,773	62.6	In orbit: early warning. Exploded 5/12/81, 5 pieces
Kosmos 1192	1980 58A	USSR	Jul 9	Plesetsk	SL-8	40	114.5	1,395	1,471	74.0	In orbit: military communications
Kosmos 1193	1980 58B	USSR	Jul 9	Plesetsk	SL-8	40	114.7	1,412	1,473	74.0	In orbit: military communications

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1194	1980 58C	USSR	Jul 9	Plesetsk	SL-8	40	114.9	1,431	1,472	74.0	In orbit: military communications
Kosmos 1195	1980 58D	USSR	Jul 9	Plesetsk	SL-8	40	115.1	1,448	1,475	74.0	In orbit: military communications
Kosmos 1196	1980 58E	USSR	Jul 9	Plesetsk	SL-8	40	115.3	1,466	1,473	74.0	In orbit: military communications
Kosmos 1197	1980 58F	USSR	Jul 9	Plesetsk	SL-8	40	115.5	1,469	1,490	74.0	In orbit: military communications
Kosmos 1198	1980 58G	USSR	Jul 9	Plesetsk	SL-8	40	115.8	1,471	1,507	74.0	In orbit: military communications
Kosmos 1199	1980 58H	USSR	Jul 9	Plesetsk	SL-8	40	116.0	1,471	1,529	74.0	In orbit: military communications
Kosmos 1200	1980 59A	USSR	Jul 9	Plesetsk	SL-4	6,300	89.7	226	289	72.8	Reentered 7-23-80: military recon/surveillance
DMSP F-5		US	Jul 14	WSMC	Thor						Failed to orbit
Ekran 5	1980 60A	USSR	Jul 15	Tyuratam	SL-12	2,700	1,438.4	1,953	69,711	9.6	In orbit: domestic TV relay
Kosmos 1201	1980 61A	USSR	Jul 15	Plesetsk	SL-4	5,700	89.1	211	246	82.3	Reentered 7/28/80: military recon/surveillance and earth resources
Rohini 1	1980 62A	India	Jul 18	Sriharikota	SLV-3	40	95.0	295	745	44.7	Decayed 5/20/81: 1st Indian-built and launched
Molynia 3-13	1980 63A	USSR	Jul 18	Plesetsk	SL-6	1,890	717.8	1,635	38,718	63.8	In orbit: civil communications
Soyuz 37	1980 64A	USSR	Jul 23	Tyuratam	SL-4	6,570	90.0	258	294	51.4	Ferried Viktor Gorbatko, Pham Tuan to Salyut 6, Crew returned on Soyuz 36. Soyuz 37 returned 10/11/80 with Soyuz 35 crew. Flight time: 7 days, 20 hrs, 42 mn
Kosmos 1202	1980 65A	USSR	Jul 24	Plesetsk	SL-4	6,300	89.7	226	289	72.8	Reentered 8/7/80: military recon/surveillance
Kosmos 1203	1980 66A	USSR	Jul 31	Plesetsk	SL-4	7,420	89.8	259	273	82.3	Reentered 8/14/80: military recon/surveillance and earth resources
Kosmos 1204	1980 67A	USSR	Jul 31	Kapustin Yar	SL-8	900	91.6	296	406	50.7	Decayed 2/23/81: radar calibration
Kosmos 1205	1980 68A	USSR	Aug 12	Plesetsk	SL-4	6,300	89.7	225	293	72.8	Reentered 8/26/80: military recon/surveillance
Kosmos 1206	1980 69A	USSR	Aug 15	Plesetsk	SL-3	3,800	96.8	601	607	81.2	In orbit: possibly electronic ferret (military)
Kosmos 1207	1980 70A	USSR	Aug 22	Plesetsk	SL-4	7,200	89.0	217	228	82.3	Reentered 9/8/80: military recon/survillance and earth resources
Kosmos 1208	1980 71A	USSR	Aug 26	Plesetsk	SL-4	6,700	89.6	171	336	67.1	Reentered 9/24/80: photo/recon

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1209	1980 72A	USSR	Sep 3	Plesetsk	SL-4	6,300	89.8	259	272	82.3	Reentered 9/17/80: military recon/surveillance and earth resources
Meteor 2 (6)	1980 73A	USSR	Sep 9	Plesetsk	SL-3	3,300	102.2	840	889	81.2	In orbit: meteorological
GOES-4	1980 74A	US	Sep 9	ETR	Delta	627	1,436.1	35,771	35,802	3.1	In orbit: weather
Soyuz 38	1980 75A	USSR	Sep 18	Tyuratam	SL-4	6,570	89.0	195	256	51.6	Manned ferry to Salyut 6; Yuri Romanenko, Arnaldo Mendez returned 9/26/80 after 7 days, 20 hrs, 43 mn
Kosmos 1210	1980 76A	USSR	Sep 19	Plesetsk	SL-4	7,420	88.7	179	243	82.2	Reentered 10/3/80: military recon/surveillance
Kosmos 1211	1980 77A	USSR	Sep 23	Plesetsk	SL-4	7,220	89.0	215	240	82.3	Reentered 10/4/80: possibly earth resources
Kosmos 1212	1980 78A	USSR	Sep 26	Plesetsk	SL-4	7,220	89.1	208	247	82.3	Reentered 10/9/80: military recon/surveillance and earth resources
Progress 11	1980 79A	USSR	Sep 28	Tyuratam	SL-4	7,020	90.7	303	318	51.6	Reentered 12/11/80: resupplied Salyut 6
Kosmos 1213	1980 80A	USSR	Oct 3	Plesetsk	SL-4	6,300	89.6	195	316	72.9	Reentered 10/17/80: military recon/surveillance
Raduga 7	1980 81A	USSR	Oct 5	Tyuratam	SL-12	2,500	1,436.5	35,789	36,801	5.0	In orbit: Statsionar 3-civil communications; radio & telegraph, centimeter bank, black & white TV, orbital network
Kosmos 1214	1980 82A	USSR	Oct 10	Plesetsk	SL-4	5,700	89.6	173	340	67.1	Reentered 10/23/80: military recon
Kosmos 1215	1980 83A	USSR	Oct 14	Plesetsk	SL-8	900	93.8	439	477	74.0	Decayed 5/12/83: radar calibration
Kosmos 1216	1980 84A	USSR	Oct 16	Plesetsk	SL-4	6,300	90.1	189	367	72.9	Reentered 10/30/80: military recon/surveillance
Kosmos 1217	1980 85A	USSR	Oct 24	Plesetsk	SL-6	1,800	716.9	3,141	37,167	67.2	In orbit: military; early warning
Kosmos 1218	1980 86A	USSR	Oct 30	Tyuratam	SL-4	6,700	89.6	165	341	64.9	Reentered 12/12/80: military recon/surveillance
FltSatCom 4	1980 87A	US	Oct 31	ETR	Atlas-Centaur	1,800	1,436.2	35,765	35,811	4.0	In orbit: military communications
Kosmos 1219	1980 88A	USSR	Oct 31	Plesetsk	SL-4	6,300	89.7	225	294	72.8	Reentered 11/13/80: military recon/surveillance
Kosmos 1220	1980 89A	USSR	Nov 4	Tyuratam	SL-11	4,150	99.1	577	856	65.0	In orbit: ocean surveillance (military) (elint). Exploded 6/20/82, 74 pieces
Kosmos 1221	1980 90A	USSR	Nov 12	Plesetsk	SL-4	6,300	90.3	192	386	72.9	Reentered 11/26/80: military recon/surveillance
SBS 1	1980 91A	US	Nov 15	ETR	Delta	550	1,436.1	35,785	35,789	0.7	In orbit: Satellite Business Systems

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Molniya 1-48	1980 92A	USSR	Nov 16	Plesetsk	SL-6	1,750	717.8	2,498	37,854	64.6	In orbit: civil; communications
Kosmos 1222	1980 93A	USSR	Nov 21	Plesetsk	SL-3	3,800	96.8	604	609	81.2	In orbit: military; monitor
Soyuz T3	1980 94A	USSR	Nov 27	Tyuratam	SL-4	7,000	89.6	255	260	51.6	Maintenance mission to Salyut 6. Leonid Kizim, Oleg Makarov, Gennadi Strekalov returned 12/10/80 after 12 days, 19 hrs, 8 mn
Kosmos 1223	1980 95A	USSR	Nov 27	Plesetsk	SL-6	1,800	718.2	3,497	36,875	65.6	In orbit: military; early warning
Kosmos 1224	1980 96A	USSR	Dec 1	Plesetsk	SL-4	6,300	90.3	197	377	72.9	Reentered 12/15/80: military recon/surveillance
Kosmos 1225	1980 97A	USSR	Dec 5	Plesetsk	SL-8	810	104.8	945	1,025	82.9	In orbit: military; navigation
Intelsat V F-2	1980 98A	US	Dec 6	ETR	Atlas-Centaur	2,000	1,436.1	35,765	35,808	0.0	In orbit: largest commercial communications
None		US	Dec 9	WSMC	Atlas E						Failed to orbit
Kosmos 1226	1980 99A	USSR	Dec 10	Plesetsk	SL-8	680	104.8	810	1,009	82.9	In orbit: military; navigation
None	1980 100A	US	Dec 13	WTR	Titan IIIB-Agena	700	Elements not available				In orbit
Kosmos 1227	1980 101A	USSR	Dec 16	Plesetsk	SL-4	6,300	89.5	197	298	72.9	Reentered 12/28/80: military recon/surveillance
Kosmos 1228	1980 102A	USSR	Dec 23	Plesetsk	SL-8	40	114.4	1,391	1,463	74.0	In orbit: military communications (tactical)
Kosmos 1229	1980 102B	USSR	Dec 23	Plesetsk	SL-8	40	114.6	1,412	1,463	74.0	In orbit: military communications (tactical)
Kosmos 1230	1980 102C	USSR	Dec 23	Plesetsk	SL-8	40	114.5	1,497	1,463	74.0	In orbit: military communications (tactical)
Kosmos 1231	1980 102D	USSR	Dec 23	Plesetsk	SL-8	40	114.5	1,403	1,463	74.0	In orbit: military communications (tactical)
Kosmos 1232	1980 102E	USSR	Dec 23	Plesetsk	SL-8	40	114.6	1,410	1,463	74.0	In orbit: military communications (tactical)
Kosmos 1233	1980 102F	USSR	Dec 23	Plesetsk	SL-8	40	114.7	1,416	1,463	74.0	In orbit: military communications (tactical)
Kosmos 1234	1980 102G	USSR	Dec 23	Plesetsk	SL-8	40	114.6	1,407	1,463	74.0	In orbit: military communications (tactical)
Kosmos 1235	1980 102H	USSR	Dec 23	Plesetsk	SL-8	40	114.6	1,411	1,463	74.0	In orbit: military communications (tactical)
Prognoz 8	1980 103A	USSR	Dec 25	Tyuratam	SL-6	910	5,687.8	978	197,364	65.8	In orbit: civil; research and solar wind interaction with magnetosphere
Ekran 6	1980 104A	USSR	Dec 26	Tyuratam	SL-12	2,700	1,436.3	35,779	35,827	4.8	In orbit: civil; communications (TV distribution)
Kosmos 1236	1980 105A	USSR	Dec 26	Plesetsk	SL-4	6,700	89.8	169	363	67.1	Reentered 1/21/81: military recon/surveillance

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1237	1980 1A	USSR	Jan 6	Plesetsk	SL-4	600	92.2	355	415	72.9	Reentered 1/21/81: photo reconnaissance
Molniya 3-14	1981 2A	USSR	Jan 9	Plesetsk	SL-6	1,500	717.7	767	39,585	64.2	In orbit: replaced Molniya 3-10; on station 1/14/81
Kosmos 1238	1981 3A	USSR	Jan 16	Plesetsk	SL-8	550	108.0	400	1,866	83.0	In orbit: minor military; paired with Kosmos 1263
Kosmos 1239	1981 4A	USSR	Jan 16	Plesetsk	SL-4	5,700	89.0	213	234	82.3	Reentered 1/28/81: photo reconnaissance
Kosmos 1240	1981 5A	USSR	Jan 20	Tyuratam	SL-4	6,700	89.7	167	361	64.9	Reentered 2/17/81: photo reconnaissance
Kosmos 1241	1981 6A	USSR	Jan 21	Plesetsk	SL-8	—	104.9	975	1,007	65.8	In orbit: ASAT target; intercepted by Kosmos 1234 and 1258
Kosmos	None	USSR	Jan 23	Plesetsk	SL-14						Failure
Progress 12	1981 7A	USSR	Jan 24	Tyuratam	SL-4	7,020	90.6	294	319	51.6	Reentered 3/20/81: resupply to Salyut 6
Kosmos 1242	1981 8A	USSR	Jan 27	Plesetsk	SL-3	2,500	97.1	608	635	81.2	In orbit
Molniya 1-49	1981 9A	USSR	Jan 30	Plesetsk	SL-6	1,000	718.3	1,195	39,185	64.1	In orbit: communications; replaced Molniya 1-41; on station 3/13/81
Kosmos 1243	1981 10A	USSR	Feb 2	Tyuratam	SL-11	—	97.8	296	1,015	65.8	Decayed 2/2/81: ASAT interceptor
Interkosmos 21	1981 11A	USSR	Feb 6	Plesetsk	SL-8	550	92.8	397	427	74.0	Decayed 7/7/82: scientific; oceanographic and terrestrial experiments
Kiku 3 (ETS 4)	1981 12A	Japan	Feb 11	Tanegashima	N-2	640	524.7	276	30,065	28.3	In orbit
Kosmos 1244	1981 13A	USSR	Feb 12	Plesetsk	SL-8	810	104.8	959	1,007	83.0	In orbit: navigation; replaced Kosmos 1104
Kosmos 1245	1981 14A	USSR	Feb 13	Plesetsk	SL-4	6,300	92.2	346	423	72.8	Reentered 2/27/81: photo reconnaissance
Kosmos 1246	1981 15A	USSR	Feb 18	Tyuratam	SL-4	6,700	89.1	197	271	64.9	Reentered 3/13/81: photo reconnaissance
Kosmos 1247	1981 16A	USSR	Feb 19	Plesetsk	SL-6	1,250	711.1	3,061	36,962	67.5	In orbit: early warning; established 5th plane of EW constellation; on station 2/23. Exploded 10/20/81, 8 pieces
Astro (Hinotori)	1981 17A	Japan	Feb 21	Uchinora	Mu-3	185	96.0	541	592	31.3	Scientific. Decayed 7/11/91
Comstar 4	1981 18A	US	Feb 21	ETR	Atlas-Centaur	1520	1,436.2	35,782	35,794	0.8	In orbit: commerical communications for COMSAT Corp.
None	1981 19A	US	Feb 28	WTR	Titan IIIB	3,000	89.3	138	336	96.4	Decayed 6/20/81
Kosmos 1248	1981 20A	USSR	Mar 5	Plesetsk	SL-4	6,700	89.6	171	345	67.1	Reentered 4/4/81: photo reconnaissance

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1249	1981 21A	USSR	Mar 5	Tyuratam	SL-11	—	103.9	892	991	65.0	In orbit: ocean surveillance; nuclear power supply; paired with Kosmos 1266; radar
Kosmos 1250	1981 22A	USSR	Mar 6	Plesetsk	SL-8	40	114.4	1,388	1,469	74.0	In orbit: military communications
Kosmos 1251	1981 22B	USSR	Mar 6	Plesetsk	SL-8	40	114.6	1,402	1,470	74.0	In orbit: military communications
Kosmos 1252	1981 22C	USSR	Mar 6	Plesetsk	SL-8	40	114.7	1,416	1,470	74.0	In orbit: military communications
Kosmos 1253	1981 22D	USSR	Mar 6	Plesetsk	SL-8	40	115.6	1,466	1,494	74.0	In orbit: military communications
Kosmos 1254	1981 22E	USSR	Mar 6	Plesetsk	SL-8	40	114.9	1,430	1,470	74.0	In orbit: military communications
Kosmos 1255	1981 22F	USSR	Mar 6	Plesetsk	SL-8	40	115.0	1,444	1,470	74.0	In orbit: military communications
Kosmos 1256	1981 22G	USSR	Mar 6	Plesetsk	SL-8	40	115.2	1,455	1,474	74.0	In orbit: military communications
Kosmos 1257	1981 22H	USSR	Mar 6	Plesetsk	SL-8	40	115.4	1,467	1,477	74.0	In orbit: military communications
Soyuz T4	1981 23A	USSR	Mar 12	Tyuratam	SL-4	7,000	91.4	338	350	51.6	Vladimir Kovalyonok, Viktor Savinykh docked w/ Soyuz 6, 5/26. Returned 5/26/81 after 74 days, 17 hrs, 38 mn
Kosmos 1258	1981 24A	USSR	Mar 14	Tyuratam	SL-11	—	97.9	301	1,024	65.8	Decayed 3/14/81: ASAT interceptor
None	1981 25A	US	Mar 16	ETR	Titan IIIC	—	1,436.2	35,776	35,801	1.3	In orbit
Kosmos 1259	1981 26A	USSR	Mar 17	Tyuratam	SL-4	6,300	92.1	350	414	70.3	Reentered 3/31/81: photo reconnaissance
Raduga 8	1981 27A	USSR	Mar 18	Tyuratam	SL-12	—	1,646.4	31,012	48,604	0.8	In orbit: communications
Kosmos 1260	1981 28A	USSR	Mar 20	Tyuratam	SL-11	—	96.8	463	749	65.0	Decayed 5/22/82: ocean surveillance; replaced Kosmos 1167. Exploded 5/8/82, 68 pieces
Soyuz 39	1981 29A	USSR	Mar 22	Tyuratam	SL-4	6,800	91.3	336	350	51.6	Vladimir Dzhanibekov, Jugderdemidyin Gurragcha docked w/ Salyut 6, 6/19. Returned 3/30/81 after 7 days, 20 hrs, 43 mn
Molniya 3-15	1981 30A	USSR	Mar 24	Plesetsk	SL-6	1,500	717.8	1,622	38,733	64.9	In orbit: communications; replaced Molniya 3-11; on station 3/28/81
Kosmos 1261	1981 31A	USSR	Mar 31	Plesetsk	SL-6	1,250	716.6	3,186	37,109	66.9	In orbit: early warning. Exploded 5/12/81, 7 pieces
Kosmos 1262	1981 32A	USSR	Apr 7	Plesetsk	SL-4	6,300	90.3	196	392	72.8	Reentered 4/21/81: photo reconnaissance
Kosmos 1263	1981 33A	USSR	Apr 9	Plesetsk	SL-8	550	108.6	392	1,873	83.0	In orbit: minor military

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
STS 1*	1981 34A	NASA	Apr 12	ETR	Columbia	4,908**	89.6	318	318	40.4	1st flight of U.S. Space Shuttle; Commander John Young, Pilot Robert Crippen landed Edwards AFB, 4/14/81, after 2 days, 6 hrs, 20 mns, 36 orbits.
Kosmos 1264	1981 35A	USSR	Apr 15	Tyuratam	SL-4	6,300	92.3	361	416	70.3	Reentered 4/19/81: photo reconnaissance
Kosmos 1265	1981 36A	USSR	Apr 16	Plesetsk	SL-4	6,300	89.6	226	289	72.8	Reentered 4/28/81: photo reconnaissance
Kosmos 1266	1981 37A	USSR	Apr 21	Tyuratam	SL-11	—	103.6	915	941	64.8	In orbit: ocean surveillance; paired with Kosmos 1249, radar
None	1981 38A	USAF	Apr 24	WTR	Titan IIIB	—	93.0	188	708	62.7	In orbit
Kosmos 1267	1981 39A	USSR	Apr 25	Tyuratam	SL-13	15,100	89.0	240	278	51.5	Reentered 7/29/82: space-station module; docked with Salyut 6, 6/19, capsule ejected 5/24/81
Kosmos 1268	1981 40A	USSR	Apr 28	Tyuratam	SL-4	6,300	90.6	241	366	70.3	Reentered 5/12/81: photo reconnaissance
Kosmos 1269	1981 41A	USSR	May 7	Plesetsk	SL-8	750	100.8	789	805	74.1	in orbit: store/dump communications; replaced Kosmos 1110
Soyuz 40	1981 42A	USSR	May 14	Tyuratam	SL-4	6,800	91.3	331	345	51.6	Leonid Popov, Dumitru Prunariu docked w/ Salyut 6, 5/15. Returned 5/22/81 after 7 days, 20 hrs, 38 mn
Meteor 2-7	1981 43A	USSR	May 14	Plesetsk	SL-3	2,750	102.3	849	887	81.3	In orbit: meteorological
Nova 1	1981 44A	US	May 15	WTR	Scout	—	Elements not available				In orbit: navigation
Kosmos 1270	1981 45A	USSR	May 18	Tyuratam	SL-4	6,700	89.7	173	348	64.8	Reentered 6/17/81: photo reconnaissance
Kosmos 1271	1981 46A	USSR	May 19	Plesetsk	SL-3	2,500	97.1	611	631	81.2	In orbit: elint; replaced Kosmos 1077
Kosmos 1272	1981 47A	USSR	May 21	Tyuratam	SL-4	6,300	92.3	361	416	70.3	Reentered 6/4/81: photo reconnaissance
Kosmos 1273	1981 48A	USSR	May 22	Plesetsk	SL-4	5,900	89.1	211	249	82.3	Reentered 6/4/81: earth resources
GOES 5	1981 49A	US	May 22	ETR	Delta	836	1,436.0	35,781	35,788	0.1	In orbit: meteorological
Intelsat V F-1	1981 50A	NASA	May 23	ETR	Atlas-Centaur	1,928	1,436.2	35,767	35,809	0.1	In orbit: commercial communications for Intelsat
Rohini 2	1981 51A	India	May 31	Sriharikota	SLV-3	38	90.5	186	418	46.3	Reentered 6/8/81: earth resources

*Space Transportation System

**Payload weight. Typical orbiter carries 13,000 kg of consumables; just short of orbit, 36,000 kg-external tank and unused main engine propellants are jettisoned

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1274	1981 52A	USSR	Jun 3	Plesetsk	SL-4	6,700	89.7	170	353	67.1	Reentered 7/3/81: photo reconnaissance
Kosmos 1275	1981 53A	USSR	Jun 4	Plesetsk	SL-8	810	104.8	957	1,010	83.0	In orbit: navigation; replaced Kosmos 1141, Exploded 7/24/81, 283 pieces
Molniya 3-16	1981 54A	USSR	Jun 9	Plesetsk	SL-6	1,500	717.6	652	39,693	64.2	In orbit: communications; replaced Molniya 3-14; on station 6/13/81
Kosmos 1276	1981 55A	USSR	Jun 16	Plesetsk	SL-4	5,900	89.0	214	237	82.3	Reentered 6/28/81: earth resources
Kosmos 1277	1981 56A	USSR	Jun 17	Tyuratam	SL-4	6,300	92.3	360	416	70.4	Reentered 7/1/81: photo reconnaissance
Meteosat 2	1981 57A	ESA	Jun 19	Kourou	Ariane	697	1,458.0	35,322	37,107	5.1	In orbit: Retired 12/91
Apple	1981 57B	India	Jun 19	Kourou	Ariane	—	1,439.8	35,751	35,965	8.4	In orbit: Indian communications
CAT 3	1981 57C	ESA	Jun 19	Kourou	Ariane	—	581.8	279	33,138	10.4	In orbit: test equipment
Kosmos 1278	1981 58A	USSR	Jun 19	Plesetsk	SL-6	1,250	717.8	2,702	37,654	67.1	In orbit: early warning. Exploded 12/86, 5 pieces
NOAA 7	1981 59A	US	Jun 23	WTR	Atlas F	1,405	101.8	838	858	99.1	In orbit: meteorological
Molniya 1-50	1981 60A	USSR	Jun 24	Plesetsk	SL-6	1,000	717.9	1,913	38,447	64.8	Communications; replaced Molniya 1-42, on station 6/30/81. Decayed 12/14/91
Ekran 7	1981 61A	USSR	Jun 26	Tyuratam	SL-12	—	1,436.2	35,766	35,810	4.5	In orbit: communications
Kosmos 1279	1981 62A	USSR	Jul 1	Tyuratam	SL-4	6,300	92.3	358	418	70.4	Reentered 7/15/81: photo reconnaissance
Kosmos 1280	1981 63A	USSR	Jul 2	Plesetsk	SL-4	6,300	89.8	258	273	82.3	Reentered 7/15/81: earth resources
Kosmos 1281	1981 64A	USSR	Jul 7	Plesetsk	SL-4	6,300	92.2	357	414	72.8	Reentered 7/21/81: photo reconnaissance
Meteor 1-31	1981 65A	USSR	Jul 10	Plesetsk	SL-3	2,200	97.4	607	659	97.7	In orbit: meteorological/natural resources
Kosmos 1282	1981 66A	USSR	Jul 15	Tyuratam	SL-4	6,700	89.5	172	336	64.9	Reentered 8/14/81: photo reconnaissance
Kosmos 1283	1981 67A	USSR	Jul 17	Plesetsk	SL-4	6,300	91.5	325	371	82.3	Reentered 7/31/81: earth resources
Kosmos 1284	1981 68A	USSR	Jul 29	Plesetsk	SL-4	6,300	91.4	325	370	82.3	Reentered 8/12/81: earth resources
Raduga 9	1981 69A	USSR	Jul 30	Tyuratam	SL-12	—	1,435.0	35,754	35,774	4.3	In orbit: communications
Dynamics-Explorer 1	1981 70A	NASA	Aug 3	WTR	Delta	403	410	464	23,370	89.5	In orbit: scientific; dual launch. Retired 2/28/91

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Dynamics-Explorer 2	1981 70B	NASA	Aug 3	WTR	Delta	—	98	298	996	90.0	Decayed 2/19/83; scientific
Kosmos 1285	1981 71A	USSR	Aug 4	Plesetsk	SL-6	1,250	727.0	3,137	37,668	66.9	In orbit: early warning; replacement for Kosmos 1261. Exploded 11/21/81 6 pieces
Kosmos 1286	1981 72A	USSR	Aug 4	Tyuratam	SL-11	—	93.4	433	447	65.0	Decayed 10/16/82: ocean surveillance; exploded 9/29/82, 30 pieces
FltSatCom 5	1981 73A	USN	Aug 6	ETR	Atlas-Centaur	1,884	1,460.0	36,218	36,287	4.3	In orbit: military communications
Kosmos 1287	1981 74A	USSR	Aug 6	Plesetsk	SL-8	40	115.7	1,463	1,510	74.0	In orbit: communications
Kosmos 1288	1981 74B	USSR	Aug 6	Plesetsk	SL-8	40	115.5	1,463	1,490	74.0	In orbit: communications
Kosmos 1289	1981 74C	USSR	Aug 6	Plesetsk	SL-8	40	114.7	1,423	1,463	74.0	In orbit: communications
Kosmos 1290	1981 74D	USSR	Aug 6	Plesetsk	SL-8	40	114.9	1,439	1,464	74.0	In orbit: communications
Kosmos 1291	1981 74E	USSR	Aug 6	Plesetsk	SL-8	40	115.1	1,455	1,463	74.0	In orbit: communications
Kosmos 1292	1981 74F	USSR	Aug 6	Plesetsk	SL-8	40	115.3	1,462	1,474	74.0	In orbit: communications
Kosmos 1293	1981 74G	USSR	Aug 6	Plesetsk	SL-8	40	114.6	1,406	1,464	74.0	In orbit: communications
Kosmos 1294	1981 74H	USSR	Aug 6	Plesetsk	SL-8	40	114.4	1,390	1,463	74.0	In orbit: communications
Interkosmos 22 (Bulgaria 1300)	1981 75A	USSR	Aug 7	Plesetsk	SL-3	1,500	101.8	795	890	81.2	In orbit: scientific; ionospheric and magnetospheric research
GMS 2 (Himawari 2)	1981 76A	Japan	Aug 10	Tanegashima	N-2	670	1,436.2	35,766	35,811	2.9	In orbit: meteorological
Kosmos 1295	1981 77A	USSR	Aug 12	Plesetsk	SL-8	700	104.7	946	1,010	82.9	In orbit: navigation; replaced Kosmos 1181
Kosmos 1296	1981 78A	USSR	Aug 13	Plesetsk	SL-4	6,700	89.7	169	357	67.1	Reentered 9/13/81: photo reconnaissance
Kosmos 1297	1981 79A	USSR	Aug 18	Plesetsk	SL-4	6,300	89.8	225	304	72.8	Reentered 8/25/81: photo reconnaissance
Kosmos 1298	1981 80A	USSR	Aug 21	Tyuratam	SL-4	6,700	89.5	173	330	64.9	Reentered 10/2/81: photo reconnaissance
Kosmos 1299	1981 81A	USSR	Aug 24	Tyuratam	SL-11	—	104.0	906	984	65.1	In orbit: ocean surveillance; nuclear power supply; raised on 9/6; worked with Kosmos 1260 & 1266; radar
Kosmos 1300	1981 82A	USSR	Aug 24	Plesetsk	SL-14	—	97.5	622	652	82.5	In orbit: oceanographic

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1301	1981 83A	USSR	Aug 27	Plesetsk	SL-4	6,300	89.8	259	272	82.3	Reentered 9/10/81: earth resources
Kosmos 1302	1981 84A	USSR	Aug 28	Plesetsk	SL-8	750	100.7	778	806	74.0	In orbit: military communications; replaced Kosmos 1269
None	1981 85A	USAF	Sep 3	WTR	Titan IIID	13,300	92.5	273	517	97.0	Reentered 11/23/84: reconnaissance
Kosmos 1303	1981 86A	USSR	Sep 4	Tyuratam	SL-4	6,300	92.3	360	415	70.4	Reentered 9/18/81: photo reconnaissance
Kosmos 1304	1981 87A	USSR	Sep 4	Plesetsk	SL-8	810	103.8	905	977	82.9	In orbit: navigation; replaced Kosmos 926
Kosmos 1305	1981 88A	USSR	Sep 11	Plesetsk	SL-6	1,000	263.7	627	13,859	62.9	In orbit: communications failure, last stage exploded, 7 pieces
Kosmos 1306	1981 89A	USSR	Sep 14	Tyuratam	SL-11	—	93.3	427	441	64.9	Decayed 7/16/82: ocean surveillance; replaced Kosmos 1260; exploded 7/12/82, 27 pieces
Kosmos 1307	1981 90A	USSR	Sep 15	Plesetsk	SL-4	6,300	92.2	354	417	72.8	Reentered 9/28/81: photo reconnaissance
Kosmos 1308	1981 91A	USSR	Sep 18	Plesetsk	SL-8	700	104.7	959	1,004	82.9	In orbit: navigation; replaced Kosmos 1275
Kosmos 1309	1981 92A	USSR	Sep 18	Plesetsk	SL-4	5,700	89.1	214	253	82.3	Reentered 10/1/81: photo reconnaissance
PRC 9	1981 93A	PRC	Sep 19	Shuang Cheng Tzu	FB-1	257	103.0	232	1,598	59.4	Reentered 9/26/81: scientific
PRC 10	1981 93B	PRC	Sep 19	Shuang Cheng Tzu	FB-1	28	103.5	235	1,615	59.4	Earth resources, reentered 10/6/82
PRC 11	1981 93C	PRC	Sep 19	Shuang Cheng Tzu	FB-1	483	103.3	235	1,598	59.5	Earth resources, reentered 8/17/82
Oreol 3	1981 94A	USSR	Sep 21	Plesetsk	SL-14	1,000	108.4	400	1,903	82.5	In orbit: scientific; Soviet/French magnetosphere and ionospheric explorer
Kosmos 1310	1981 95A	USSR	Sep 23	Plesetsk	SL-8	—	93.0	401	438	65.8	Minor military. Decayed 4/3/89
SBS 2	1981 96A	US	Sep 24	ETR	Thor-Delta	550	1,436.1	35,785	35,787	0.0	In orbit: commercial communications for Satellite Business Systems Corp.
Kosmos 1311	1981 97A	USSR	Sep 28	Plesetsk	SL-8	—	94.0	444	493	83.0	Decayed 8/28/83: minor military
Kosmos 1312	1981 98A	USSR	Sep 30	Plesetsk	SL-14	—	115.9	1,490	1,499	82.6	In orbit
Kosmos 1313	1981 99A	USSR	Oct 1	Tyuratam	SL-4	6,300	89.6	231	279	70.3	Reentered 10/15/81: photo reconnaissance

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
SME	1981 100A	NASA	Oct 6	WTR	Thor-Delta	437	94.7	504	506	97.7	Solar Mesophere Explorer; scientific; dual launch. Decayed 3/5/91
Uosat/Oscar 9	1981 100B	NASA/ UK	Oct 6	WTR	Thor-Delta	52	94.1	472	478	97.7	British radio science. Decayed 10/13/89
Kosmos 1314	1981 101A	USSR	Oct 9	Plesetsk	SL-4	63,00	88.9	212	235	82.3	Reentered 10/22/81: earth resources
Reduga 10	1981 102A	USSR	Oct 9	Tyuratam	SL-12	—	1,436.2	35,781	35,796	4.2	In orbit: communications
Kosmos 1315	1981 103A	USSR	Oct 13	Plesetsk	SL-3	2,500	97.4	612	651	81.2	In orbit: elint; replaced Kosmos 1154
Kosmos 1316	1981 104A	USSR	Oct 15	Tyuratam	SL-4	6,300	89.6	232	278	70.3	Reentered 10/29/81: photo reconnaissance
Molniya 3-17	1981 105A	USSR	Oct 17	Plesetsk	SL-6	1,500	717.8	2,569	37,785	64.5	In orbit: communications; replaced Molniya 3-12; on station 10/21
Venera 13	1981 106A	USSR	Oct 30	Tyuratam	SL-12	—	Heliocentric orbit				In orbit: Venus lander; soft landing on Venus 3/82
None	1981 107A	USAF	Oct 31	ETR	Titan IIIC	—	Elements not available				In orbit
Kosmos 1317	1981 108A	USSR	Oct 31	Plesetsk	SL-6	1,250	719.0	3,070	37,343	64.4	In orbit. Exploded 1/25/84, 7 pieces
Kosmos 1318	1981 109A	USSR	Nov 3	Plesetsk	SL-4	6,700	89.7	171	352	67.1	Reentered 12/4/81: photo reconnaissance
Venera 14	1981 110A	USSR	Nov 4	Tyuratam	SL-12	—	Heliocentric orbit				In orbit: Venus lander; soft landing on Venus 3/82
STS 2	1981 111A	US	Nov 12	ETR	Columbia	8,516*	89.6	259	259	38	Richard Truly, commander, Joe Engle, pilot aboard 2nd shuttle flight. Landed Edwards AFB after 2 days, 6 hrs, 13 mns, total 36 orbits
Kosmos 1319	1981 112A	USSR	Nov 13	Tyuratam	SL-4	6,300	92.1	350	413	70.3	Reentered 11/27/81: photo reconnaissance
Molniya 1-51	1981 113A	USSR	Nov 17	Plesetsk	SL-6	1,000	717.5	510	39,830	64.1	In orbit: communications; replaced Molniya 1-39; on station 12/4
RCA Satcom 3R	1981 114A	NASA	Nov 20	ETR	Delta	1,078	1,436.2	35,779	35,794	0.0	In orbit: commerical communications for RCA
Bhaskara 2	1981 115A	India	Nov 20	Kapustin Yar	SL-8	444	94.8	498	518	50.6	Indian; earth resources. Decayed 11/30/91
Kosmos 1320	1981 116A	USSR	Nov 28	Plesetsk	SL-8	40	117.2	1,478	1,633	74.0	In orbit: communications
Kosmos 1321	1981 116B	USSR	Nov 28	Plesetsk	SL-8	40	117.2	1,479	1,630	74.0	In orbit: communications

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1322	1981 116C	USSR	Nov 28	Plesetsk	SL-8	40	117.2	1,478	1,628	74.0	In orbit: communications
Kosmos 1323	1981 116D	USSR	Nov 28	Plesetsk	SL-8	40	117.1	1,479	1,623	74.0	In orbit: communications
Kosmos 1324	1981 116E	USSR	Nov 28	Plesetsk	SL-8	40	117.1	1,478	1,619	74.0	In orbit: communications
Kosmos 1325	1981 116F	USSR	Nov 28	Plesetsk	SL-8	40	117.0	1,478	1,616	74.0	In orbit: communications
Kosmos 1326	1981 116G	USSR	Nov 28	Plesetsk	SL-8	40	117.0	1,478	1,610	74.0	In orbit: communications
Kosmos 1327	1981 116H	USSR	Nov 28	Plesetsk	SL-8	40	116.9	1,479	1,602	74.0	In orbit: communications
Kosmos 1328	1981 117A	USSR	Dec 3	Plesetsk	SL-14	—	97.6	631	660	82.5	In orbit: oceanographic
Kosmos 1329	1981 118A	USSR	Dec 4	Tyuratam	SL-4	6,300	89.4	233	261	65.0	Reentered 11/18/81: photo reconnaissance
Intelsat V F-3	1981 119A	NASA	Dec 15	ETR	Atlas-Centaur	1,870	1,436.1	35,773	35,800	0.1	In orbit: commercial communications for Intelsat
Radio 3	1981 120A	USSR	Dec 17	Plesetsk	SL-8	—	118.4	1,561	1,657	83.0	In orbit: amateur radio
Radio 8	1981 120B	USSR	Dec 17	Plesetsk	SL-8	—	119.6	1,648	1,681	83.0	In orbit: amateur radio
Radio 5	1981 120C	USSR	Dec 17	Plesetsk	SL-8	—	119.4	1,648	1,663	83.0	In orbit: amateur radio
Radio 4	1981 120D	USSR	Dec 17	Plesetsk	SL-8	—	119.3	1,634	1,662	83.0	In orbit: amateur radio
Radio 7	1981 120E	USSR	Dec 17	Plesetsk	SL-8	—	119.1	1,621	1,657	83.0	In orbit: amateur radio
Radio 6	1981 120F	USSR	Dec 17	Plesetsk	SL-8	—	118.6	1,577	1,658	83.0	In orbit: amateur radio
NAVSTAR	—	US	Dec 18	WTR	Atlas E	—	—	—	—	—	Launch failure: navigation
Kosmos 1330	1981 121A	USSR	Dec 19	Tyuratam	SL-4	6,700	89.6	160	348	70.4	Reentered 1/19/82: photo reconnaissance
Marecs 1	1981 122A	ESA	Dec 20	Kourou	Ariane	582	1,436.1	35,770	35,807	0.9	In orbit: final development flight of Ariane; maritime communications
CAT 4	1981 122B	ESA	Dec 20	Kourou	Ariane	217	599.7	241	34,115	10.4	In orbit: test equipment on Ariane launch vehicle
Molniya 1-52	1981 123A	USSR	Dec 23	Tyuratam	SL-6	1,000	717.8	1,544	38,810	63.4	In orbit: communications; replaced Molniya 1-45; on station 12/30/81
Kosmos 1331	1982 1A	USSR	Jan 7	Plesetsk	SL-8	750	100.6	768	806	74.0	In orbit: communications; replaced Kosmos 1302
Kosmos 1332	1982 2A	USSR	Jan 12	Plesetsk	SL-4	5,700	89.0	210	248	82.3	Reentered 1/25/82: photo recon
Kosmos 1333	1982 3A	USSR	Jan 14	Plesetsk	SL-8	810	104.9	966	1,012	82.9	In orbit: navigation; replaced Kosmos 1150

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
RCA Satcom IV	1982 4A	US	Jan 16	ESMC	Delta	1,082	1,436.2	35,779	35,797	0.0	In orbit: commerical communications
Kosmos 1334	1982 5A	USSR	Jan 20	Plesetsk	SL-4	6,300	89.6	226	289	72.8	Reentered 2/3/82: photo recon, maneuvered
None	1982 6A	US	Jan 21	WSMC	Titan IIIB-Agena	—	97.4	630	641	97.2	Decayed 5/23/82
Kosmos 1335	1982 7A	USSR	Jan 29	Plesetsk	SL-8	550	94.5	479	514	74.0	Decayed 4/5/87. Minor military; replaced Kosmos 1186
Kosmos 1336	1982 8A	USSR	Jan 30	Tyuratam	SL-4	6,700	89.7	169	356	70.3	Reentered 2/26/82: photo recon, maneuvered
Ekran 8	1982 9A	USSR	Feb 5	Tyuratam	SL-12	4,000	1,441.0	35,766	35,998	4.0	In orbit: communications
Kosmos 1337	1982 10A	USSR	Feb 11	Tyuratam	SL-11	1,500	93.3	428	446	65.0	Decayed 7/25/82: ocean surveillance; paired with Kosmos 1306
Kosmos 1338	1982 11A	USSR	Feb 16	Plesetsk	SL-4	6,000	92.2	359	411	72.8	Reentered 3/2/82: photo recon, maneuvered
Kosmos 1339	1982 12A	USSR	Feb 17	Plesetsk	SL-8	810	104.7	948	1,015	82.9	In orbit: navigation; replaced Kosmos 1092
Kosmos 1340	1982 13A	USSR	Feb 19	Plesetsk	SL-3	2,500	97.3	621	638	81.2	In orbit: elint; replaced Kosmos 1206
Westar IV	1982 14A	US	Feb 26	ESMC	Delta 3910	1,072	1,436.2	35,772	35,806	0.1	In orbit: replaced Westar I; TV, voice & facimile data
Molniya 1-53	1982 15A	USSR	Feb 26	Plesetsk	SL-6	1,000	717.9	2,180	38,179	63.8	In orbit: communications; replaced Molniya 1-47; on station 3/3
Kosmos 1341	1982 16A	USSR	Mar 3	Plesetsk	SL-6	1,250	719.0	2,611	37,805	66.8	In orbit: early warning; replaced Kosmos 1247; on station 3/10
Intelsat V F-4	1982 17A	ITSO*	Mar 5	ESMC	Atlas-Centaur	1,928	1,436.2	35,773	35,805	0.1	In orbit: international communications
Kosmos 1342	1982 18A	USSR	Mar 5	Plesetsk	SL-4	6,300	89.6	227	288	72.8	Reentered 3/19/82: photo recon, maneuvered
None	1982 19A	US	Mar 6	ESMC	Titan IIIC	—	1,435.9	35,769	35,796	1.3	In orbit: development of spacecraft techniques and technology
Gorizont 5	1982 20A	USSR	Mar 15	Tyuratam	SL-12	—	1,436.0	35,774	35,796	3.3	In orbit: communications
Kosmos 1343	1982 21A	USSR	Mar 17	Plesetsk	SL-4	6,300	89.6	228	288	72.8	Reentered 3/31/82: photo recon, maneuvered

*International Telecommunications Satellite Organization

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
STS 3	1982 22A	US	Mar 22	KSC	Columbia	10,299*	89.4	247	247	38.0	Jack Lousma, commander; Gordon Fullerton, pilot flew 8 day, 5 mn mission, landing 3/30/82 at White Sands, New Mexico
Molniya 3-18	1982 23A	USSR	Mar 24	Plesetsk	SL-6	1,500	717.8	1,500	38,856	64.9	In orbit: communications; replaced Molniya 3-15, on station 4/10
Kosmos 1344	1982 24A	USSR	Mar 24	Plesetsk	SL-8	810	104.9	970	1,010	82.9	In orbit: navigation; replaced Kosmos 1244
Meteor 2-8	1982 25A	USSR	Mar 25	Plesetsk	SL-14	2,750	104.0	941	962	82.5	In orbit: meteorological
Kosmos 1345	1982 26A	USSR	Mar 31	Plesetsk	SL-8	900	94.2	461	494	74.0	Elint. Decayed 9/27/89
Kosmos 1346	1982 27A	USSR	Mar 31	Plesetsk	SL-3	2,500	97.4	613	650	81.2	In orbit: elint; replaced Kosmos 1222
Kosmos 1347	1982 28A	USSR	Apr 2	Tyuratam	SL-4	6,700	89.6	171	337	70.3	Reentered 5/21/82: photo recon, maneuvered
Kosmos 1348	1982 29A	USSR	Apr 7	Plesetsk	SL-6	1,250	719.1	2,545	37,872	63.1	In orbit: early warning, replaced Kosmos 1172; on station 4/15
Kosmos 1349	1982 30A	USSR	Apr 8	Plesetsk	SL-8	810	104.9	968	1,012	82.9	In orbit: navigation; replaced Kosmos 1153
Insat 1A	1982 31A	India	Apr 10	ESMC	Thor Delta	1,152	1,434.2	35,562	35,936	0.1	In orbit: provides nationwide direct broadcasting to community TV receivers in rural areas of India
Kosmos 1350	1982 32A	USSR	Apr 15	Plesetsk	SL-4	6,700	89.8	171	357	67.1	Reentered 5/16/82: photo recon, maneuvered
Salyut 7	1982 33A	USSR	Apr 19	Tyuratam	SL-13	18,900	94.1	473	474	51.6	In orbit: space station; replaced Salyut 6. Decayed 2/7/91
Iskra 2	1982 33C	USSR	May 17	Salyut 7	—	28	91.3	340	345	51.6	Decayed 7/9/82: amateur radio; ejected from Salyut 7, 5/17/82
Iskra 3	1982 33D	USSR	Nov 18	Salyut 7	—	28	91.5	349	353	51.6	Decayed 12/16/82: amateur radio; brought to Salyut 7 by Progress 16; ejected 11/18/82
Kosmos 1351	1982 34A	USSR	Apr 21	Kapustin Yar	SL-8	550	93.5	349	546	50.6	Decayed 3/14/83: minor military
Kosmos 1352	1982 35A	USSR	Apr 21	Tyuratam	SL-4	6,300	92.1	349	415	70.3	Reentered 5/5/82: photo recon, maneuvered
Kosmos 1353	1982 36A	USSR	Apr 23	Plesetsk	SL-4	5,900	89.0	211	241	82.3	Reentered 5/6/82: photo recon, maneuvered
Kosmos 1354	1982 37A	USSR	Apr 28	Plesetsk	SL-8	750	100.8	794	807	74.0	In orbit: communications; replaced Kosmos 1190

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1355	1982 38A	USSR	Apr 29	Tyuratam	SL-11	—	93.3	428	446	65.0	Decayed 8-27-83: ocean surveillance; paired with Kosmos 1405. Multiple explosions 8/8/83 and later, 30 pieces
Kosmos 1356	1982 39A	USSR	May 5	Plesetsk	SL-3	2,500	97.6	623	661	81.2	In orbit: elint; replaced Kosmos 1184
Kosmos 1357	1982 40A	USSR	May 6	Plesetsk	SL-8	40	114.6	1,402	1,479	74.0	In orbit: communications
Kosmos 1358	1982 40B	USSR	May 6	Plesetsk	SL-8	40	114.8	1,416	1,481	74.0	In orbit: communications
Kosmos 1359	1982 40C	USSR	May 6	Plesetsk	SL-8	40	115.0	1,433	1,481	74.0	In orbit: communications
Kosmos 1360	1982 40D	USSR	May 6	Plesetsk	SL-8	40	115.2	1,447	1,483	74.0	In orbit: communications
Kosmos 1361	1982 40E	USSR	May 6	Plesetsk	SL-8	40	115.3	1,462	1,484	74.0	In orbit: communications
Kosmos 1362	1982 40F	USSR	May 6	Plesetsk	SL-8	40	115.5	1,467	1,496	74.0	In orbit: communications
Kosmos 1363	1982 40G	USSR	May 6	Plesetsk	SL-8	40	115.7	1,474	,1506	74.0	In orbit: communications
Kosmos 1364	1982 40H	USSR	May 6	Plesetsk	SL-8	40	115.9	1,474	1,525	74.0	In orbit: communications
None	1982 41A	US	May 11	WSMC	Titan IIID	—	88.6	157	251	96.3	Decayed 12/5/82
Soyuz T5	1982 42A	USSR	May 13	Tyuratam	SL-4	6,850	91.4	343	345	51.5	Anatoli Berezovoi, Valentin Lebedev docked w/ Salyut 7, 4/19. Remained for 211 days, 8 hrs, 5 mns, returning aboard Soyuz T7. Soyuz T5 returned Soyuz T7 crew, 8/27/82
Kosmos 1365	1982 43A	USSR	May 14	Tyuratam	SL-11	1,500	103.7	892	970	65.1	In orbit: ocean surveillance, nuclear power supply; raised 9/27/82; paired with Kosmos 1372
Kosmos 1366	1982 44A	USSR	May 17	Tyuratam	SL-12	4,000	1,436.18	35,765	35,808	3.4	In orbit: communications; new SHF transponders
Kosmos 1367	1982 45A	USSR	May 20	Plesetsk	SL-6	1,250	718.9	2,230	38,180	63.5	In orbit: early warning; established 9th plane on station 5/23/82
Kosmos 1368	1982 46A	USSR	May 21	Tyuratam	SL-4	6,300	90.0	210	340	70.3	Reentered 6/3/82: photo recon, maneuvered
Progress 13	1982 47A	USSR	May 23	Tyuratam	SL-4	7,020	91.3	338	343	51.6	Reentered 6/6/82: resupply to Salyut 7; docked 5/25/82
Kosmos 1369	1982 48A	USSR	May 25	Plesetsk	SL-4	6,300	89.9	267	274	82.3	Reentered 6/8/82: photo recon, maneuvered

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 1370	1982 49A	USSR	May 28	Tyuratam	SL-4	6,700	89.2	197	275	64.8	Reentered 7/11/82: photo recon, maneuvered
Molniya 1-54	1982 50A	USSR	May 28	Plesetsk	SL-6	1,000	717.8	1,059	39,295	64.9	In orbit: communications; replaced Molniya 1-44; on station 6/3/82
Kosmos 1371	1982 51A	USSR	Jun 1	Plesetsk	SL-8	750	100.8	791	811	74.0	In orbit: replaced Kosmos 1140
Kosmos 1372	1982 52A	USSR	Jun 1	Tyuratam	SL-11	1,500	103.9	929	956	64.9	In orbit: ocean surveillance, nuclear power supply; raised 8/11/82; paired with Kosmos 1365
Kosmos 1373	1982 53A	USSR	Jun 2	Tyuratam	SL-4	6,300	92.7	365	448	70.4	Reentered 6/16/82: photo recon, maneuvered
Kosmos 1374	1982 54A	USSR	Jun 3	Kapustin Yar	SL-8	1,000	88.1	158	204	50.6	Man related. Recovered 6/3/82 after 1 1/4 revolutions
Kosmos 1375	1982 55A	USSR	Jun 6	Plesetsk	SL-8	2,000	105.0	980	1,010	65.8	In orbit: ASAT target; intercepted by Kosmos 1379. Exploded 10/21/85, 50 pieces
Kosmos 1376	1982 56A	USSR	Jun 8	Plesetsk	SL-4	6,300	89.8	259	272	82.3	Reentered 6/22/82: photo recon, maneuvered
Kosmos 1377	1982 57A	USSR	Jun 8	Tyuratam	SL-4	6,700	89.9	173	367	64.9	Reentered 7/22/82: photo recon, maneuvered
Westar 5	1982 58A	US	Jun 9	ESMC	Delta	1,072	1,436.1	35,782	35,791	0.1	In orbit: relay voice data, video & facimile to U.S., Hawaii, Alaska, Puerto Rico & Virgin Islands
Kosmos 1378	1982 59A	USSR	Jun 10	Plesetsk	SL-14	2,200	97.5	626	653	82.5	In orbit: oceanographic phased with Kosmos 1300 and 1328
Kosmos 1379	1982 60A	USSR	Jun 18	Tyuratam	SL-11	1,500	100.4	537	1,019	65.8	Decayed 6/18/82: ASAT, passed near Kosmos 1375 after 2 revolutions
Kosmos 1380	1982 61A	USSR	Jun 18	Plesetsk	SL-8	810	93.2	140	725	82.9	Reentered 6/27/82: navigation, intended to replace Kosmos 1225
Kosmos 1381	1982 62A	USSR	Jun 18	Tyuratam	SL-4	6,300	92.6	360	451	70.3	Reentered 7/1/82: photo recon, maneuvered
Soyuz T6	1982 63A	USSR	Jun 24	Tyuratam	SL-4	6,850	90.4	283	306	51.6	Visiting Vladimir Dzhanibekov, Alexander Ivanchenkov, Jean-Loup Chretien docked w/ Salyut 7, 6/25. Returned 7/2/82 after 7 days, 22 hrs, 42 mns
Kosmos 1382	1982 64A	USSR	Jun 25	Plesetsk	SL-6	1,250	717.9	3,021	37,340	64.5	In orbit: early warning; replaced Kosmos 1223, on station 6/29/82

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
STS-4	1982 65A	US	Jun 27	KSC	Columbia	11,107*	90.6	318	318	28.5	Final shuttle test flight. Commander Ken Mattingly, Pilot Hank Hartsfield flew 7 day, 1 hr, 10 mn mission, landing 7/4/82
Kosmos 1383	1982 66A	USSR	Jun 29	Plesetsk	SL-8	810	105.3	989	1,028	82.9	In orbit: navigation; replaced Kosmos 1223, on station 6/29/82
Kosmos 1384	1982 67A	USSR	Jun 30	Plesetsk	SL-4	6,700	89.7	171	356	67.1	Reentered 7/30/82: photo recon, maneuvered
Kosmos 1385	1982 68A	USSR	Jul 6	Plesetsk	SL-4	6,300	91.4	307	388	82.3	Reentered 7/20/82: photo recon, maneuvered
Kosmos 1386	1982 69A	USSR	Jul 7	Plesetsk	SL-8	810	104.7	947	1,008	83.0	In orbit: navigation; replaced Kosmos 1225
Progress 14	1982 70A	USSR	Jul 10	Tyuratam	SL-4	7,020	90.8	306	325	51.6	Reentered 8/13/82: resupply to Salyut 7; docked 7/12/82
Kosmos 1387	1982 71A	USSR	Jul 13	Plesetsk	SL-4	5,900	89.0	211	242	82.3	Reentered 7/26/82: photo recon, no major maneuver
Landsat 4	1982 72A	US	Jul 16	WSMC	Thor Delta	1,942	98.8	699	701	98.2	In orbit: acquire multispectral imagery sufficient to improve remote sensing techniques and test new instrument, thematic mapper
Kosmos 1388	1982 73A	USSR	Jul 21	Plesetsk	SL-8	40	114.5	1,394	1,475	74.0	In orbit: communications
Kosmos 1389	1982 73B	USSR	Jul 21	Plesetsk	SL-8	40	114.7	1,410	1,476	74.0	In orbit: communications
Kosmos 1390	1982 73C	USSR	Jul 21	Plesetsk	SL-8	40	114.9	1,428	1,475	74.0	In orbit: communications
Kosmos 1391	1982 73D	USSR	Jul 21	Plesetsk	SL-8	40	115.0	1,444	1,476	74.0	In orbit: communications
Kosmos 1392	1982 73E	USSR	Jul 21	Plesetsk	SL-8	40	115.2	1,461	1,475	74.0	In orbit: communications
Kosmos 1393	1982 73F	USSR	Jul 21	Plesetsk	SL-8	40	115.4	1,470	1,484	74.0	In orbit: communications
Kosmos 1394	1982 73G	USSR	Jul 21	Plesetsk	SL-8	40	115.6	1,475	1,497	74.0	In orbit: communications
Kosmos 1395	1982 73H	USSR	Jul 21	Plesetsk	SL-8	40	115.8	1,474	1,517	74.0	In orbit: communications
Molniya 1-55	1982 74A	USSR	Jul 21	Tyuratam	SL-6	1,000	717.8	1,565	38,291	64.9	In orbit: communications; replaced Molniya 1-46, on station 7/27/82
Ekran	None	USSR	Jul 23	Tyuratam	SL-12	—	—	—	—	—	1st stage failure
Kosmos 1396	1982 75A	USSR	Jul 27	Plesetsk	SL-4	6,300	89.6	228	287	72.8	Reentered 8/10/82: photo recon, maneuvered

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1397	1982 76A	USSR	Jul 29	Kapustin Yar	SL-8	550	93.4	345	541	50.6	Decayed 5/18/83: minor military
Kosmos 1398	1982 77A	USSR	Aug 3	Plesetsk	SL-4	5,900	88.9	215	234	82.3	Reentered 8/13/82: photo recon, no major maneuver
Kosmos 1399	1982 78A	USSR	Aug 4	Tyuratam	SL-4	6,700	89.6	170	343	64.9	Reentered 9/16/82: photo recon, maneuvered
Kosmos 1400	1982 79A	USSR	Aug 5	Plesetsk	SL-3	2,500	97.3	620	642	81.2	In orbit: elint; replaced Kosmos 1315
Soyuz T7	1982 80A	USSR	Aug 19	Tyuratam	SL-4	6,850	90.4	290	299	51.6	Leonid Popov, Alexander Serebrov, Svetlana Savitskaya visited Salyut 7, docking 8/20. Returned aboard Soyuz T5. Soyuz T7 returned Soyuz T5 crew 12/10/82. Flight time: 7 days, 21 hr, 52 mn
Kosmos 1401	1982 81A	USSR	Aug 20	Plesetsk	SL-4	6,300	89.8	260	272	82.3	Reentered 9/3/82: photo recon, maneuvered
Anik D-1	1982 82A	Canada	Aug 26	ESMC	Delta	730*	1,436.1	35,774	35,802	0.0	In orbit: Canadian communications (Telesat G)
Molniya 3-19	1982 83A	USSR	Aug 27	Plesetsk	SL-6	1500	717.3	1,005	39,325	63.5	In orbit: communications; replaced Molniya 3-13, on station 9/25/82
Kosmos 1402	1982 84A	USSR	Aug 30	Tyuratam	SL-11	3,000	89.6	251	264	65.0	Decayed 1/23/83: ocean surveillance; worked with Kosmos 1365 & 1412. Reactor decayed 2/83
Kosmos 1403	1982 85A	USSR	Sep 1	Tyuratam	SL-4	6,300	92.2	353	415	70.3	Reentered 9/15/82: photo recon, maneuvered
Kosmos 1404	1982 86A	USSR	Sep 1	Plesetsk	SL-4	6,300	92.2	357	415	72.8	Reentered 9/15/82: photo recon, maneuvered
ETS-3 (Kiku 4)	1982 87A	Japan	Sep 3	Tanegashima	N-1	385	107.2	968	1,228	44.6	In orbit: verified 3-axis attitude control using telemetry data received via tape recorder, solar array deployment & active thermal control, and other experiments
Kosmos 1405	1982 88A	USSR	Sep 4	Tyuratam	SL-11	1,500	93.3	427	445	65.0	Decayed 2/5/84: ocean surveillance; paired with Kosmos 1355. Exploded 12/10/83, 140 pieces
Kosmos 1406	1982 89A	USSR	Sep 8	Plesetsk	SL-4	5,900	88.9	213	231	82.3	Reentered 9/21/82: photo recon, maneuvered
PRC 12	1982 90A	PRC	Sep 9	Shuang Cheng Tzu	CZ-2	2,500	90.8	174	385	62.9	Decayed 9/21/82
Marecs/Sirio	None	ESA	Sep 9	Kourou	Ariane						Launch failure
Kosmos 1407	1982 91A	USSR	Sep 15	Plesetsk	SL-4	6,700	89.6	172	340	67.1	Reentered 10/16/82: photo recon, maneuvered

*Weight after apogee kick motor firing

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1408	1982 92A	USSR	Sep 16	Plesetsk	SL-14	2,200	97.6	626	658	82.6	In orbit: oceanographic, replaced Kosmos 1378
Ekran 9	1982 93A	USSR	Sep 16	Tyuratam	SL-12	4,000	1,435.8	35,628	35,931	1.7	In orbit: communications
Progress 15	1982 94A	USSR	Sep 18	Tyuratam	SL-4	7,020	90.8	302	327	51.6	Reentered 10/16/82: resupply to Salyut 7; docked 9/20/82
Kosmos 1409	1982 95A	USSR	Sep 22	Plesetsk	SL-6	1,250	717.9	2,035	38,326	64.3	In orbit: early warning, replaced Kosmos 1217; on station 9/28/82
Kosmos 1410	1982 96A	USSR	Sep 24	Plesetsk	SL-14	2,200	115.9	1,494	1,502	82.6	In orbit: communications, phased with Kosmos 1312
Intelsat V F-5	1982 97A	ITSO	Sep 28	ESMC	Atlas-Centaur	2,000	1,436.2	35,766	35,810	0.1	In orbit: provides 12,000 voice circuits and 2 color-TV channels simultaneously
Kosmos 1411	1982 98A	USSR	Sep 30	Plesetsk	SL-4	6,300	89.6	229	287	72.8	Reentered 10/14/82: photo recon, maneuvered
Kosmos 1412	1982 99A	USSR	Oct 2	Tyuratam	SL-11	1,500	103.9	889	997	64.8	In orbit: ocean surveillance, nuclear power supply; paired with Kosmos 1402
Kosmos 1413	1982 100A	USSR	Oct 12	Tyuratam	SL-12	4,000	673.3	19,068	19,070	64.7	In orbit: navigation, 1st launch of new generation system
Kosmos 1414	1982 100D	USSR	Oct 12	Tyuratam	SL-12	—	675.7	19,066	19,192	64.7	In orbit: navigation
Kosmos 1415	1982 100E	USSR	Oct 12	Tyuratam	SL-12	—	673.5	19,070	19,075	64.7	In orbit: navigation
Kosmos 1416	1982 101A	USSR	Oct 14	Tyuratam	SL-4	6,300	89.6	232	278	70.3	Reentered 10/28/82: photo recon, maneuvered
Kosmos 1417	1982 102A	USSR	Oct 19	Plesetsk	SL-8	810	104.7	955	1,008	83.0	In orbit: navigation, replaced Kosmos 1308
Gorizont 6	1982 103A	USSR	Oct 20	Tyuratam	SL-12	4,000	1,435.9	35,781	35,784	3.0	In orbit: communications
Kosmos 1418	1982 104A	USSR	Oct 21	Kapustin Yar	SL-8	550	92.4	371	414	50.6	Decayed 9/30/83: minor military
RCA Satcom-V	1982 105A	US	Oct 28	ESMC	Delta	589.5	1,436.1	35,781	35,793	0.0	In orbit: provide TV, voice channels, & high speed data to all 50 states & provide cable TV throughout U.S.
DSCS II F-16	1982 106A	US	Oct 30	ESMC	Titan 34D-IUS	—	1,436.1	35,780	35,797	1.5	In orbit. 1st use of IUS
DSCS III F-1	1982 106B	US	Oct 30	ESMC	Titan 34D-IUS	—	1,436.1	35,784	35,789	0.1	In orbit
Progress 16	1982 107A	USSR	Oct 31	Tyuratam	SL-4	7,020	91.7	354	362	51.6	Reentered 12/14/82: resupply to Salyut 7, docked 11/2/82
Kosmos 1419	1982 108A	USSR	Nov 2	Tyuratam	SL-4	6,300	89.6	230	281	70.3	Reentered 11/16/82: photo recon, maneuvered
Kosmos 1420	1982 109A	USSR	Nov 11	Plesetsk	SL-8	750	100.7	779	810	74.0	In orbit: communications, replaced Kosmos 1331

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
STS-5	1982 110A	US	Nov 11	KSC	Columbia	14,549*	90.3	302	302	28.5	1st operational flight of STS. Crew: Vance Brand, commander; Robert Overmyer, pilot; Joseph Allen, William Lenoir, mission specialists. Launched 2 satellites. Returned 11/16/82 after 5 days, 2 hrs, 14 mns
SBS-3	1982 110B	US	Nov 11	STS-5	PAM-D**	1,117	1,436.1	35,786	35,790	0.0	In orbit: provide all-digital transmission of telephone, computer, electronic mail, video conferencing to Satellite Business System clients
Anik C-3	1982 110C	Canada	Nov 12	STS-5	PAM-D**	632.3	1,436.0	35,778	35,796	0.0	In orbit: Canadian commercial communications
None	1982 111A	US	Nov 17	WSMC	Titan IIID	—	92.0	268	474	97.0	Decayed 8/13/85
Kosmos 1421	1982 112A	USSR	Nov 18	Tyuratam	SL-4	6,300	89.6	230	281	70.3	Reentered 12/2/82: photo recon, maneuvered
Raduga II	1982 113A	USSR	Nov 26	Tyuratam	SL-12	4,000	1,435.7	35,766	35,793	2.4	In orbit: communications
Kosmos 1422	1982 114A	USSR	Dec 3	Plesetsk	SL-4	6,300	89.6	228	288	72.8	Reentered 12/17/82: photo recon, maneuvered
Kosmos 1423	1982 115A	USSR	Dec 8	Tyuratam	SL-6	6,050	93.7	400	516	62.8	Decayed 1/18/86: communications, intended to replace Molniya 1-48; broke up after launch, 31 pieces
Meteor 2-9	1982 116A	USSR	Dec 14	Plesetsk	SL-3	2,750	101.9	810	890	81.2	In orbit: meteorological, possible replacement for Meteor 2-6
Kosmos 1424	1982 117A	USSR	Dec 16	Tyuratam	SL-4	6,700	89.7	172	350	64.9	Reentered 1/28/83: photo recon, maneuvered
DMSP 6	1982 118A	US	Dec 21	WSMC	Atlas E	—	101.2	811	823	98.7	In orbit
Kosmos 1425	1982 119A	USSR	Dec 23	Tyuratam	SL-4	6,300	92.1	346	416	69.9	Reentered 1/6/83: photo recon, maneuvered
Raduga	None	USSR	Dec 24	Tyruatam	SL-12	—	—	—	—	—	2nd stage failure
Kosmos 1426	1982 120A	USSR	Dec 28	Tyuratam	SL-4	6,700	90.0	202	356	50.5	Decayed 3/5/83
Kosmos 1427	1982 121A	USSR	Dec 29	Plesetsk	SL-8	2,200	93.4	427	455	65.8	Minor military, possibly related to ASAT calibration. Decayed 10/5/89

*Payload weight

**Payload Assist Module—Delta Class

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1428	1983 1A	USSR	Jan 12	Plesetsk	SL-8	810	104.6	955	1,004	82.9	In orbit: military communications navigation, replaced Kosmos 1333
Kosmos 1429	1983 2A	USSR	Jan 19	Plesetsk	SL-8	40	115.8	1,467	1,519	74.0	In orbit: military communications
Kosmos 1430	1983 2B	USSR	Jan 19	Plesetsk	SL-8	40	115.6	1,467	1,500	74.0	In orbit: military communications
Kosmos 1431	1983 2C	USSR	Jan 19	Plesetsk	SL-8	40	115.4	1,465	1,485	74.0	In orbit: military communications
Kosmos 1432	1983 2D	USSR	Jan 19	Plesetsk	SL-8	40	115.2	1,464	1,468	74.0	In orbit: military communications
Kosmos 1433	1983 2E	USSR	Jan 19	Plesetsk	SL-8	40	115.0	1,447	1,468	74.0	In orbit: military communications
Kosmos 1434	1983 2F	USSR	Jan 19	Plesetsk	SL-8	40	114.8	1,432	1,468	74.0	In orbit: military communications
Kosmos 1435	1983 2G	USSR	Jan 19	Plesetsk	SL-8	40	114.7	1,416	1,468	74.0	In orbit: military communications
Kosmos 1436	1983 2H	USSR	Jan 19	Plesetsk	SL-8	40	114.5	1,400	1,467	74.0	In orbit: communications
Kosmos 1437	1983 3A	USSR	Jan 20	Plesetsk	SL-3	2,500	97.5	627	657	81.1	In orbit: elint
IRAS	1983 4A	US	Jan 26	WSMC	Delta	1,073	102.9	890	909	99.1	In orbit: 1st all-sky survey to search for astronomical objects emitting infrared radiation; NASA, Netherlands, UK
Kosmos 1438	1983 5A	USSR	Jan 27	Tyuratam	SL-4	6,300	89.6	166	345	70.4	Reentered 2/7/83: photo recon, maneuvered
CS-2A	1983 6A	Japan	Feb 4	Tanegashima	N-2	772	1,436.2	35,783	35,794	0.4	In orbit: business data, facsimile & video service
Kosmos 1439	1983 7A	USSR	Feb 6	Tyuratam	SL-4	—	88.6	168	250	70.3	Reentered 2/22/83: photo recon, maneuvered, earth resources
None	1983 8A	US	Feb 9	WSMC	Atlas F	—	107.4	1,059	1,156	63.4	In orbit
Kosmos 1440	1983 9A	USSR	Feb 10	Plesetsk	SL-4	2,500	89.8	259	274	82.3	Reentered 2/24/83: photo recon, maneuvered
Kosmos 1441	1983 10A	USSR	Feb 16	Plesetsk	SL-3	2,000	97.3	624	632	81.1	In orbit: elint
Astro-B	1983 11A	Japan	Feb 20	Kagoshima	Mu 3S	185	93.6	456	455	31.5	X-ray observation; also known as Tenma. Decayed 12/17/88
Kosmos 1442	1983 12A	USSR	Feb 25	Plesetsk	SL-4	2,500	89.6	171	341	67.1	Reentered 4/11/83: photo recon, maneuvered

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 1443	1983 13A	USSR	Mar 2	Tyuratam	SL-13	2,000	91.0	325	327	51.6	Reentered 9/19/83: space station module, mated with Salyut 7; docked 3/10/83. Separated 8/14. Capsule down 8/23
Kosmos 1444	1983 14A	USSR	Mar 2	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Reentered 3/16/83: photo recon, maneuvered
Molniya 3-20	1983 15A	USSR	Mar 11	Plesetsk	SL-6	1,500	718.0	2,066	38,298	63.3	In orbit: communications, replaced Molniya 3-17, on station 4/7/83
Ekran 10	1983 16A	USSR	Mar 12	Tyuratam	SL-12	4,000	1,515.4	37.139	37,508	4.6	In orbit: communications
Kosmos 1445	1983 17A	USSR	Mar 15	Kapustin Yar	SL-8	1,000	88.5	177	224	50.6	Recovered 3/16/83: space plane test, recovered in Indian Ocean
Kosmos 1446	1983 18A	USSR	Mar 16	Tyuratam	SL-4	6,300	89.6	226	284	69.9	Reentered 3/30/83: photo recon, maneuvered
Molniya 1-56	1983 19A	USSR	Mar 16	Plesetsk	SL-6	1,000	720.5	2,382	38,705	63.6	In orbit: communications, replaced Molniya 1-50, on station 3/29/83
Astron	1983 20A	USSR	Mar 23	Tyuratam	SL-12	3,250	5,915.8	25,128	178,817	79.8	In orbit: scientific Soviet-French astrophysical mission. Spent booster exploded, 16 pieces
Kosmos 1447	1983 21A	USSR	Mar 24	Plesetsk	SL-8	810	104.8	959	1,013	82.9	In orbit: navigation, replaced Kosmos 1226; carried COSPAS transponder
NOAA 8	1983 22A	US	Mar 28	WSMC	Atlas E	3,775	101.2	803	825	98.7	In orbit: search and rescue/weather/communications and navigation. Battery exploded 12/30/85, 9 fragments
Kosmos 1448	1983 23A	USSR	Mar 30	Plesetsk	SL-8	810	104.7	956	1,003	83.0	In orbit: navigation, replaced Kosmos 1344
Kosmos 1449	1983 24A	USSR	Mar 31	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Reentered 4/15/83: photo recon, maneuvered
Molniya 1-57	1983 25A	USSR	Apr 2	Tyuratam	SL-6	1,000	717.6	552	39,795	63.6	In orbit: communications, replaced Molniya 1-52, on station 4/7/83
STS-6	1983 26A	US	Apr 4	KSC	Challenger	21,277*	89.6	284	284	28.0	1st flight of shuttle Challenger; 1st shuttle EVA. Crew: Paul Weitz, commander; Karol Bobko, pilot; Story Musgrave, Donald Peterson, mission specialists. Launched 1 satellite, returned 4/9/83 after 5 days, 23 mns

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
TDRSS	1983 26B	US	Apr 5	STS-6	IUS	2,268	1,436.4	35,785	35,798	1.4	In orbit: spacecraft-to-ground communications for U.S. launches
Kosmos 1450	1983 27A	USSR	Apr 6	Plesetsk	SL-8	—	94.1	450	495	65.9	Minor military; possibly related to ASAT calibration. Decayed 5/30/90
Raduga 12	1983 28A	USSR	Apr 8	Tyuratam	SL-12	—	1,435.5	35,765	35,823	2.1	In orbit: communications
Kosmos 1451	1983 29A	USSR	Apr 8	Plesetsk	SL-4	6,300	89.9	226	322	82.3	Reentered 4/22/83: photo recon, maneuvered
RCA Satcom VI	1983 30A	US	Apr 11	ESMC	Delta	2,385	1,436.1	35,775	35,798	0.0	In orbit: 1st completely solid-state domestic communications. Retired 2/91
Kosmos 1452	1983 31A	USSR	Apr 12	Plesetsk	SL-8	750	100.7	781	805	74.0	In orbit: communications, replaced Kosmos 1371
None	1983 32A	US	Apr 15	WSMC	Titan IIIB-Agena	—	88.4	135	311	96.5	Decayed 8/21/83
Rohini 3	1983 33A	India	Apr 17	Sriharikota	SLV-3	42	96.4	384	785	46.6	Indian earth resources. Decayed 4/19/90
Kosmos 1453	1983 34A	USSR	Apr 19	Plesetsk	SL-8	550	93.8	441	476	74.0	Minor military. Decayed 5/8/89
Soyuz T8	1983 35A	USSR	Apr 20	Tyuratam	SL-4	6,850	88.5	196	213	51.6	Vladimir Titov, Gennadi Strekalov, Alexander Serebrov failed to dock with Salyut 7. Returned 4/22/83 after 2 days, 20 mns
Kosmos 1454	1983 36A	USSR	Apr 22	Plesetsk	SL-4	6,700	89.7	172	351	67.1	Reentered 5/22/83: photo recon, maneuvered
Kosmos 1455	1983 37A	USSR	Apr 23	Plesetsk	SL-14	—	97.7	636	663	82.5	In orbit: elint; apparently phased with Kosmos 1470
Kosmos 1456	1983 38A	USSR	Apr 25	Plesetsk	SL-6	1,250	717.5	1,799	38,590	66.5	In orbit: early warning, replaced Kosmos 1191, on station 4/28/83. Exploded 8/12/83, 10 pieces
Kosmos 1457	1983 39A	USSR	Apr 26	Tyuratam	SL-4	6,700	89.7	171	348	70.3	Reentered 6/8/83: photo recon, maneuvered
Kosmos 1458	1983 40A	USSR	Apr 28	Plesetsk	SL-4	5,900	89.0	212	246	82.3	Reentered 5/11/83: photo recon, maneuvered; earth resources
GOES 6	1983 41A	US	Apr 28	ESMC	Delta	836	1,437.9	35,782	35,864	0.1	In orbit: weather; 3rd in series, NOAA operated
Kosmos 1459	1983 42A	USSR	May 6	Plesetsk	SL-8	810	104.7	945	1,017	82.9	In orbit: navigation, replaced Kosmos 1349
Kosmos 1460	1983 43A	USSR	May 6	Tyuratam	SL-4	6,300	92.2	350	416	70.3	Reentered 5/20/83: photo recon, maneuvered

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 1461	1983 44A	USSR	May 7	Tyuratam	SL-11	1,500	99.3	581	870	65.0	In orbit: ocean surveillance, phased with Kosmos 1507. Exploded 3/11/85
Kosmos 1462	1983 45A	USSR	May 17	Plesetsk	SL-4	6,300	89.8	256	276	82.3	Reentered 5/31/83: photo recon, maneuvered; earth resources
Kosmos 1463	1983 46A	USSR	May 19	Plesetsk	SL-8	550	102.0	298	1,407	82.9	In orbit: minor military
Intelsat V F-6	1983 47A	ITSO	May 19	ESMC	Atlas-Centaur	1,928	1,436.1	35,765	35,810	0.1	In orbit: communications
Kosmos 1464	1983 48A	USSR	May 24	Plesetsk	SL-8	810	104.8	967	1,009	82.9	In orbit: navigation, replaced Kosmos 1295
Kosmos 1465	1983 49A	USSR	May 26	Kapustin Yar	SL-8	550	93.5	349	543	50.6	Decayed 1/23/85: minor military
Kosmos 1466	1983 50A	USSR	May 26	Tyuratam	SL-4	6,700	89.6	173	344	64.8	Reentered 7/6/83: photo recon, maneuvered
Exosat	1983 51A	ESA	May 26	WSMC	Delta	510	5,429.0	2,919	188,993	71.4	Decayed 5/6/86: X-ray studies
Kosmos 1467	1983 52A	USSR	May 31	Plesetsk	SL-4	6,300	92.2	357	415	72.8	Reentered 6/12/83: photo recon, maneuvered
Venera 15	1983 53A	USSR	Jun 2	Tyuratam	SL-12	4,000	Trans-Venus trajectory				In orbit: Venus orbiter; radar mapper; entered 24-hour orbit around Venus 10/10/83
Venera 16	1983 54A	USSR	Jun 7	Tyuratam	SL-12	4,000	Trans-Venus trajectory				In orbit: Venus orbiter; radar mapper; entered 24-hour orbit around Venus 10/14/83
Kosmos 1468	1983 55A	USSR	Jun 7	Plesetsk	SL-4	6,300	89.8	253	278	82.3	Reentered 6/21/83: photo recon, maneuvered
None	1983 56A	US	Jun 9	WSMC	Atlas H	—	Elements not available				In orbit
Kosmos 1469	1983 57A	USSR	Jun 14	Plesetsk	SL-4	6,300	90.2	194	377	72.8	Reentered 6/24/83: photo recon, maneuvered
ECS-1	1983 58A	ESA	Jun 16	Kourou	Ariane	1,050	1,436.2	35,777	35,803	0.1	In orbit: telephone & TV communications & distribution
Amsat/Oscar 10	1983 58B	ESA	Jun 16	Kourou	Ariane	69.5	699.6	3,990	35,461	27.1	In orbit: Int'l amateur radio
STS-7	1983 59A	US	Jun 18	KSC	Challenger	16,817*	90.	314	314	28.0	1st 5-person crew including 1st American woman in space. Crew: Commander Robert Crippen; Pilot Frederick Hauck; Mission Specialists Sally Ride, John Fabian & Norman Thagard. Launched 2 satellites, deployed/retrieved 1 payload, returned 6/24/83 after 6 days, 2 hrs, 24 mns

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Anik C2	1983 59B	Canada	Jun 18	STS-7	PAM-D	1,238	1,436.1	35,776	35,798	0.0	In orbit: Canadian; also known as Telsat 7
Palapa SL-7	1983 59C	Indo	Jun 19	STS-7	PAM-D	1,200	1,436.8	35,677	35,924	1.0	In orbit: Indonesian communications
SPAS	1983 59D	FRG	Jun 20	STS-7	RMS*	1,442	90.0	160	258	96.4	Platform. Deployed, retrieved from shuttle
None	1983 60A	US	Jun 20	WSMC	Titan 34D	32,000	88.3	162	217	96.4	Decayed 3/21/84
Kosmos 1470	1983 61A	USSR	Jun 23	Plesetsk	SL-14	—	97.6	676	665	82.5	In orbit: elint; apparently phased with Kosmos 1455
Soyuz T9	1983 62A	USSR	Jun 27	Tyuratam	SL-4	6,850	91.1	325	337	51.6	Vladimir Lyakhov, Aleksander Aleksandrov docked w/ Salyut 7, 6/28. Performed 2 spacewalks, returned 11/23/83 after 149 days, 9 hrs 46 mns
None	1983 63A	US	Jun 27	WSMC	Scout	—	101.0	771	837	82.0	In orbit
Kosmos 1471	1983 64A	USSR	Jun 28	Plesetsk	SL-4	6,700	89.8	182	351	67.1	Reentered 7/28/83: photo recon, maneuvered
Galaxy 1	1983 65A	US	Jun 28	ESMC	Delta	1,218	1,436.3	35,785	35,798	0.0	In orbit: communications; Hughes TV
Gorizont 7	1983 66A	USSR	Jul 1	Tyuratam	SL-12	—	1,436.1	35,760	35,811	1.8	In orbit: communications
Prognoz 9	1983 67A	USSR	Jul 1	Tyuratam	SL-6	1,060	26.7	380	720,000	65.5	In orbit: investigating interplanetary, interstellar space
Kosmos 1472	1983 68A	USSR	Jul 5	Plesetsk	SL-4	6,300	91.5	336	361	82.3	Reentered 7/19/83: photo recon, maneuvered; earth resources
Kosmos 1473	1983 69A	USSR	Jul 6	Plesetsk	SL-8	40	114.4	1,396	1,462	74.0	In orbit: military communications
Kosmos 1474	1983 69B	USSR	Jul 6	Plesetsk	SL-8	40	114.6	1,412	1,463	74.0	In orbit: military communications
Kosmos 1475	1983 69C	USSR	Jul 6	Plesetsk	SL-8	40	114.8	1,430	1,463	74.0	In orbit: military communications
Kosmos 1476	1983 69D	USSR	Jul 6	Plesetsk	SL-8	40	114.9	1,447	1,463	74.0	In orbit: military communications
Kosmos 1477	1983 69E	USSR	Jul 6	Plesetsk	SL-8	40	115.1	1,462	1,466	74.0	In orbit: military communications
Kosmos 1478	1983 69F	USSR	Jul 6	Plesetsk	SL-8	40	115.3	1,463	1,483	74.0	In orbit: military communications
Kosmos 1479	1983 69G	USSR	Jul 6	Plesetsk	SL-8	40	115.5	1,463	1,501	74.0	In orbit: military communications
Kosmos 1480	1983 69H	USSR	Jul 6	Plesetsk	SL-8	40	115.8	1,463	1,521	74.0	In orbit: military communications
Kosmos 1481	1983 70A	USSR	Jul 8	Plesetsk	SL-6	1,250	707.3	2,128	37,709	67.2	In orbit: early warning, intended to replace Kosmos 1285; last stage exploded

*Remote Manipulator System

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1482	1983 71A	USSR	Jul 13	Tyuratam	SL-4	6,300	92.1	351	412	69.9	Reentered 7/27/83: photo recon, maneuvered; earth resources
Navstar 8	1983 72A	US	Jul 14	WSMC	Atlas E	—	725.8	19,952	20,798	62.8	In orbit
Molniya 1-58	1983 73A	USSR	Jul 19	Tyuratam	SL-6	1,000	624.7	393	35,263	64.0	In orbit: communications, replaced Molniya 1-49, on station 7/25/83
Kosmos 1483	1983 74A	USSR	Jul 20	Plesetsk	SL-4	6,300	89.8	258	273	82.3	Reentered 8/3/83: photo recon, maneuvered; earth resources
Kosmos 1484	1983 75A	USSR	Jul 24	Tyuratam	SL-3	2,500	97.1	588	653	97.9	In orbit: earth resources, follow-on to Meteor-Priroda series
Kosmos 1485	1983 76A	USSR	Jul 26	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Reentered 8/9/83: photo recon, maneuvered
Telstar 3A	1983 77A	US	Jul 28	KSC	Delta	1,225	1,436.1	35,778	35,797	0.0	In orbit: AT&T/ commercial communications
None	1983 78A	US	Jul 31	WSMC	Titan IIIB-Agena D		Current elements not maintained				In orbit
Kosmos 1486	1983 79A	USSR	Aug 3	Plesetsk	SL-8	750	100.7	783	804	74.0	In orbit: communications, replaced Kosmos 1354
Kosmos 1487	1983 80A	USSR	Aug 5	Plesetsk	SL-4	6,300	89.8	258	273	82.3	Reentered 8/19/83: photo recon, maneuvered; earth resources
CS-2	1983 81A	Japan	Aug 5	Tanegashima	N II	670	1,436.1	35,785	35,789	0.0	In orbit: communications, also known as Sakura 2B
Kosmos 1488	1983 82A	USSR	Aug 9	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Reentered 8/23/83: photo recon, maneuvered
Kosmos 1489	1983 83A	USSR	Aug 10	Tyuratam	SL-4	6,700	89.2	175	301	64.7	Reentered 9/23/83: photo recon, maneuvered
Kosmos 1490	1983 84A	USSR	Aug 10	Tyuratam	SL-12	—	675.7	19,087	19,171	64.8	In orbit: navigation; 2nd Glonass test flight
Kosmos 1491	1983 84B	USSR	Aug 10	Tyuratam	SL-12	—	668.4	18,794	19,096	64.7	In orbit: navigation
Kosmos 1492	1983 84C	USSR	Aug 10	Tyuratam	SL-12	—	676.8	19,153	19,160	64.8	In orbit: navigation
Progress 17	1983 85A	USSR	Aug 17	Tyuratam	SL-4	7,020	91.1	320	340	51.6	Reentered 9/18/83: resupply to Salyut 7, docked 8/19/83
PRC 13	1983 86A	PRC	Aug 19	Shuang Cheng Tzu	CZ-2	2,500	88.8	160	266	63.3	Recovered 9/3/83: deployment & recovery techniques; also known as China II
Kosmos 1493	1983 87A	USSR	Aug 23	Plesetsk	SL-4	6,300	92.2	359	413	72.8	Reentered 9/6/83: photo recon, maneuvered

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Raduga 13	1983 88A	USSR	Aug 25	Tyuratam	SL-12	4,000	1,436.4	35,785	35,800	1.6	In orbit: communications
STS-8	1983 89A	US	Aug 30	KSC	Challenger	13,624*	90	307	307	28.0	Crew: Commander Richard Truly; Pilot Daniel Brandenstein; Mission Specialists Guion Bluford, Jr., Dale Gardner, William Thornton. Deployed 1 satellite, tested RMS. Returned 9/5/83 after 6 days, 1 hr, 8 mn
Insat 1B	1983 89B	US	Aug 31	STS-8	PAM-D	1,152	1436.2	35,636	35,939	0.2	In orbit: Indian weather satellite
Molniya 3-21	1983 90A	USSR	Aug 30	Plesetsk	SL-6	1,500	717.9	1,104	39,253	63.1	In orbit: communications; established new orbital plane, on station 9/5/83
Kosmos 1494	1983 91A	USSR	Aug 31	Kapustin Yar	SL-8	550	93.5	345	551	50.6	Decayed 9/26/85: minor military
Kosmos 1495	1983 92A	USSR	Sep 3	Plesetsk	SL-4	6,300	88.9	213	235	82.3	Reentered 9/16/83: photo recon, maneuvered
Kosmos 1496	1983 93A	USSR	Sep 7	Plesetsk	SL-4	2,500	89.5	173	335	67.1	Reentered 10/19/83: photo recon, maneuvered
RCA Satcom VII	1983 94A	US	Sep 8	ESMC	Delta-PAM-D	1,121	1,436.2	35,782	35,794	0.1	In orbit: RCA commercial communications
Kosmos 1497	1983 95A	USSR	Sep 9	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Reentered 9/23/83: photo recon, maneuvered
Kosmos 1498	1983 96A	USSR	Sep 14	Plesetsk	SL-4	6,300	89.8	259	273	82.3	Reentered 9/29/83: photo recon, maneuvered; earth resources
Kosmos 1499	1983 97A	USSR	Sep 17	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Reentered 10/1/83: photo recon, maneuvered
Galaxy 2	1983 98A	US	Sep 22	ESMC	Delta	1,218	1,436.2	35,783	35,795	0.0	In orbit: communications, Hughes TV
None	None	USSR	Sep 26	Tyuratam	SL-4	6,600					Launch pad explosion. Vladimir Titov, Gennadi Strekalov saved by launch escape system, landing 2 miles downrange
Kosmos 1500	1983 99A	USSR	Sep 28	Plesetsk	SL-14	—	97.6	627	662	82.5	In orbit: oceanographic & earth resources
Ekran II	1983 100A	USSR	Sep 29	Tyuratam	SL-12	—	1,435.8	35,779	35,783	1.7	In orbit: communications
Kosmos 1501	1983 101A	USSR	Sep 30	Plesetsk	SL-8	—	93.9	442	483	82.9	Minor military; similar to Kosmos 1311. Decayed 5/26/89
Kosmos 1502	1983 102A	USSR	Oct 5	Plesetsk	SL-8	750	92.3	367	411	65.8	Decayed 8/29/85: minor military; possibly related to ASAT calibration
Kosmos 1503	1983 103A	USSR	Oct 12	Plesetsk	SL-8	750	100.8	789	809	74.0	In orbit: communications; replacement for Kosmos 1486

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1504	1983 104A	USSR	Oct 14	Tyuratam	SL-4	6,700	89.2	172	307	64.8	Reentered 12/6/83: photo recon, maneuvered
Intelsat V F-7	1983 105A	ITSO	Oct 19	Kourou	Ariane 1	1,928	1,436.1	35,772	35,803	0.1	In orbit: communications
Progress 18	1983 106A	USSR	Oct 20	Tyuratam	SL-4	7,020	91.2	329	346	51.6	Reentered 11/16/83: resupply to Salyut 7; docked 10/22/83
Kosmos 1505	1983 107A	USSR	Oct 21	Plesetsk	SL-4	6,300	92.2	357	414	72.8	Reentered 11/4/83: photo recon, maneuvered
Kosmos 1506	1983 108A	USSR	Oct 26	Plesetsk	SL-8	810	104.7	951	1,013	82.9	In orbit: navigation; replaced Kosmos 1304
Meteor 2-10	1983 109A	USSR	Oct 28	Plesetsk	SL-3	2,750	101.3	752	889	81.1	In orbit: meteorological; phased with Meteor 2-7 and 2-9
Kosmos 1507	1983 110A	USSR	Oct 29	Tyuratam	SL-11	—	93.2	426	436	65.0	Decayed 8/19/87. Ocean surveillance; phased with Kosmos 1461
Kosmos 1508	1983 111A	USSR	Nov 11	Plesetsk	SL-8	550	108.8	394	1,943	82.9	In orbit: minor military
Kosmos 1509	1983 112A	USSR	Nov 17	Plesetsk	SL-4	6,300	89.6	226	291	72.8	Reentered 12/3/83: photo recon, maneuvered
DMSP 7	1983 113A	US	Nov 18	WSMC	Atlas E	—	101.4	815	832	98.7	In orbit
Molniya 1-59	1983 114A	USSR	Nov 23	Plesetsk	SL-6	1,000	717.8	1,016	39,338	63.1	In orbit: communications; replaced Molniya 1-48, on station 12/10/83
Kosmos 1510	1983 115A	USSR	Nov 24	Plesetsk	SL-14	—	116.0	1,480	1,525	73.6	In orbit: geodetic; related to Kosmos 1410 & Kosmos 1312
STS-9	1983 116A	US	Nov 28	KSC	Columbia	15,068*	89.5	250	250	57.0	1st flight of ESA Spacelab. Crew: Commander John Young; Pilot Brewster Shaw, Jr.; Mission Specialists Drs. Owen Garriott, Robert Parker; Payload Specialists Drs. Byron Lichtenberg, Ulf Merbold. Returned 12/8/83 after 10 days,7 hrs, 47 mn
Kosmos 1511	1983 117A	USSR	Nov 30	Plesetsk	SL-4	6,700	89.6	171	342	67.1	Reentered 1/13/84: photo recon, maneuvered
Gorizont 8	1983 118A	USSR	Nov 30	Tyuratam	SL-12	—	1,436.3	35,796	35,783	1.4	In orbit: communications
Kosmos 1512	1983 119A	USSR	Dec 7	Plesetsk	SL-4	6,300	92.2	352	419	72.8	Reentered 12/21/83: photo recon, maneuvered
Kosmos 1513	1983 120A	USSR	Dec 8	Plesetsk	SL-8	810	104.8	961	1,017	82.9	In orbit: navigation; replaced Kosmos 1417
Kosmos 1514	1983 121A	USSR	Dec 14	Plesetsk	SL-4	5,700	89.2	214	259	82.3	Reentered 12/19/83: biosat; international biological flight

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1515	1983 122A	USSR	Dec 15	Plesetsk	SL-14	—	97.7	637	663	82.5	In orbit: elint; related to Kosmos 1455 and 1470
Molniya 3-22	1983 123A	USSR	Dec 21	Plesetsk	SL-6	1,500	717.6	623	39,720	64.7	In orbit: communications; replaced Molniya 3-16, on station 12/25/83
Kosmos 1516	1983 124A	USSR	Dec 27	Tyuratam	SL-4	6,700	89.2	196	276	64.8	Reentered 2/9/84: photo recon, maneuvered
Kosmos 1517	1983 125A	USSR	Dec 27	Kapustin Yar	SL-8	1,000	88.5	180	221	50.6	Recovered 12/27/83: space plane test, recovered after 1 revolution
Kosmos 1518	1983 126A	USSR	Dec 28	Plesetsk	SL-6	1,250	713.9	1,472	38,692	66.5	In orbit: early warning; replaced Kosmos 1341; on station 1/4/84
Kosmos 1519	1983 127A	USSR	Dec 29	Tyuratam	SL-12	—	675.7	19,107	19,151	65.3	In orbit: navigation; 3rd GLONASS launch
Kosmos 1520	1983 127B	USSR	Dec 29	Tyuratam	SL-12	—	675.7	19,065	19,193	65.3	In orbit: navigation
Kosmos 1521	1983 127C	USSR	Dec 29	Tyuratam	SL-12	—	673.4	18,999	19,142	65.3	In orbit: navigation
Kosmos 1522	1984 001A	USSR	Jan 5	Plesetsk	C-I	40	115.4	1,459	1,491	74.0	Tactical communications
Kosmos 1523	1984 001B	USSR	Jan 5	Plesetsk	C-I	40	114.4	1,395	1,459	74.0	Tactical communications
Kosmos 1524	1984 001C	USSR	Jan 5	Plesetsk	C-I	40	114.6	1,410	1,459	74.0	Tactical communications
Kosmos 1525	1984 001D	USSR	Jan 5	Plesetsk	C-I	40	114.7	1,426	1,459	74.0	Tactical communications
Kosmos 1526	1984 001E	USSR	Jan 5	Plesetsk	C-I	40	114.9	1,441	1,459	74.0	Tactical communications
Kosmos 1527	1984 001F	USSR	Jan 5	Plesetsk	C-I	40	115.1	1,457	1,459	74.0	Tactical communications
Kosmos 1528	1984 001G	USSR	Jan 5	Plesetsk	C-I	40	115.3	1,459	1,475	74.0	Tactical communications
Kosmos 1529	1984 001H	USSR	Jan 5	Plesetsk	C-I	40	115.6	1,459	1,510	74.0	Tactical communications
Kosmos 1530	1984 002A	USSR	Jan 11	Plesetsk	SL-4	6,300	92.2	356	416	72.8	Military photo recon, recovered 1/25
Kosmos 1531	1984 003A	USSR	Jan 11	Plesetsk	C-I	810	105.0	977	1,009	82.9	Navigation, replaced Kosmos 1386
Kosmos 1532	1984 004A	USSR	Jan 13	Plesetsk	SL-4	6,700	89.5	166	359	67.1	Military photo recon, recovered 2/26
BS-2A	1984 005A	Japan	Jan 23	Tanegashima	N-II	670	1,436.3	35,777	35,799	0.0	Direct TV signal broadcasting to remote areas of Japan
Kosmos 1533	1984 006A	USSR	Jan 26	Plesetsk	SL-4	6,300	92.1	346	415	70.3	Military photo recon, recovered 2/9
Kosmos 1534	1984 007A	USSR	Jan 26	Plesetsk	SL-8	—	94.3	454	501	65.8	Elint. Decayed 9/20/90

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
PRC 14	1984 008A	PRC	Jan 29	Xi Chang	CZ-3	900	163.4	467	6,580	36.2	Third stage failure; apogee kick motor fired in low orbit
Unannounced	1984 009A	US	Jan 31	ESMC	Titan 34D	1,043	Elements not available				In orbit
Kosmos 1535	1984 010A	USSR	Feb 2	Plesetsk	SL-8	810	104.8	951	1,015	83.0	Navigation, replaced Kosmos 1428
STS 41B	1984 011A	US	Feb 3	KSC	Challenger	15,342*	90.61	326	326	28.4	Crew: Vance Brand, Robert Gibson, Ronald McNair, Bruce McCandless, Robert Stewart. Launched 2 satellites, tested MMU**, returned 2/11 after 7 days, 23 hours, 16 mns
Westar VI	1984 011B	US	Feb 3	STS	PAM-D	1,200	99.8	303	1,216	27.6	Western Union communications satellite, failed to reach intended orbit, recovered by STS 51-A 11/16
IRT	1984 011C	US	Feb 5	STS	—	91	89.8	269	279	28.4	Integrated Rendezvous Target, disintegrated 2/ll
Palapa B2	1984 011D	US	Feb 4	STS	PAM-D	1,200	99.2	277	1,186	28.1	Communications for Indonesian gov't, failed to reach intended orbit, recovered by STS 51-A, 11/16
Unannounced	1984 012A	US	Feb 5	WSMC	Atlas H		Elements not available				In orbit. Three subsatellites
Kosmos 1536	1984 013A	USSR	Feb 8	Plesetsk	SL-14	2,200	97.6	629	662	82.4	Elint
Soyuz T-10	1984 014A	USSR	Feb 8	Tyuratam	SL-4	6,850	90.3	289	296	51.6	Crew: Leonid Kizim, Vladimir Solovyov, Oleg Atkov. Docked w/ Salyut 7, 2/9. Undocked and reentered (with visiting Soyuz T-11 crew) 4/11. Soyuz T-10 crew returned aboard Soyuz T-11, 10/2. Flight time: 236 days, 22 hr, 50 mn.
Ohzora (EXOS C)	1984 015A	Japan	Feb 14	Kagoshima	Mu-3S	180	92.8	317	503	74.6	Middle Atmosphere Programmer; optically sensing atmosphere and ionosphere. Decayed 7/19/89
Raduga 14	1984 016A	USSR	Feb 14	Tyuratam	SL-12	2,000	1,436.5	35,778	35,811	2.3	TV, radio, telegraph communications, positioned above 84 deg. e long.
Kosmos 1537	1984 017A	USSR	Feb 16	Plesetsk	SL-4	6,300	89.8	259	273	82.3	Earth resources photo recon, recovered 3/1
Progress 19	1984 018A	USSR	Feb 21	Tyuratam	SL-4	7,020	90.1	281	286	51.6	Resupplied Salyut 7, Docked 2/23, undocked 3/31, reentered 4/1

*Payload weight

**Manned Maneuvering Unit

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1538	1984 019A	USSR	Feb 21	Plesetsk	SL-8	700	100.7	775	807	74.0	Military communications, replaced Kosmos 1420
Kosmos 1539	1984 020A	USSR	Feb 28	Plesetsk	SL-4	6,700	90.0	182	374	67.1	Military photo recon, recovered 4/9
Landsat 5	1984 021A	US	Mar 1	WSMC	Delta	1,938	98.8	699	700	98.2	Earth resources remote sensing
Uosat 2/Oscar 9	1984 021B	UK	Mar 1	WSMC	Delta	52	98.4	674	693	98.2	Magnetospheric studies, earth imaging, amateur radio digital communications
Kosmos 1540	1984 022A	USSR	Mar 2	Tyuratam	SL-12	—	1,436.2	35,782	35,795	3.0	Communications relay, stationed at 79 deg. e long.
Intelsat VA-8	1984 023A	ITSO	Mar 5	Kourou	Ariane 1	1,928	1,436.1	35,769	35,806	0.0	Communications
Kosmos 1541	1984 024A	USSR	Mar 6	Plesetsk	SL-6	1,250	718.9	1,664	38,744	63.3	Early warning, replaced Kosmos 1278
Kosmos 1542	1984 025A	USSR	Mar 7	Tyuratam	SL-4	6,300	92.1	348	414	70.3	Military photo recon, recovered 3/21
Kosmos 1543	1984 026A	USSR	Mar 10	Plesetsk	SL-4	5,700	90.6	216	395	62.8	Military photo recon, recovered 4/5
Kosmos 1544	1984 027A	USSR	Mar 15	Plesetsk	SL-14	—	97.6	629	660	82.5	Elint
Ekran 12	1984 028A	USSR	Mar 16	Tyuratam	SL-12	2,000	1,435.7	35,773	35,885	4.4	TV transmission to remote areas, positioned at 99 deg. e long.
Molniya 1-60	1984 029A	USSR	Mar 16	Plesetsk	SL-6	1,800	717.5	1,105	39,232	64.8	TV, telephone, telegraph communications, replaced Molniya 1-51
Kosmos 1545	1984 030A	USSR	Mar 21	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Military photo recon, recovered 4/5
Kosmos 1546	1984 031A	USSR	Mar 29	Tyuratam	SL-12	—	1,436.1	35,685	35,887	2.1	Communications relay, stationed at 23 deg. w long.
Soyuz T-11	1984 032A	USSR	Apr 3	Tyuratam	SL-4	6,850	90.3	287	299	51.6	Crew: Yuri Malyshev, Gennadi Strekalov, Rakesh Sharma; docked w/ Salyut 7 4/4. Crew returned aboard Soyuz T-10, 4/11; Soyuz T-II undocked and reentered w/ T-10 crew, 10/2. Flight time: 7 days, 21 hr, 41 mn.
Kosmos 1547	1984 033A	USSR	Apr 4	Plesetsk	SL-6	1,250	718.3	955	38,456	66.5	Early warning, replaced Kosmos 1382
STS 41-C	1984 034A	US	Apr 6	KSC	Challenger	17,334*	91.1	498	498	28.5	Crew: Robert Crippen, Dick Scobee, Terry Hart, George Nelson, James Van Hoften; repaired and redeployed Solar Maximum Satellite, deployed LDEF, returned 4/13 after 6 days, 23 hrs, 40 mns

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
LDEF	1984 034B	US	Apr 7	STS	RMS*	3,625	94.0	467	470	28.5	Long Duration Exposure Facility; sampling effects of space conditions on electronic systems, scientific packages. Retrieved by STS-32, returned 1/20/90
PRC 15	1984 035A	PRC	Apr 8	Xi Chang	CZ-3	900	1,436.1	35,776	35,795	1.5	Experimental geosynchronous communications satellite located above 125 deg. e long.
Kosmos 1548	1984 036A	USSR	Apr 10	Plesetsk	SL-4	6,700	89.5	167	333	67.1	Military photo recon, recovered 5/24
Unannounced	1984 037A	US	Apr 15	ESMC	Titan 34D		Elements not available				In orbit
Progress 20	1984 038A	USSR	Apr 15	Tyuratam	SL-4	7,020	90.2	280	291	51.6	Resupplied Salyut 7, docked 4/17, undocked 5/6, reentered 5/7
Unannounced	1984 039A	US	Apr 17	WSMC	Titan IIIB-Agena D		88.9	127	235	96.4	Decayed 8/13/84
Kosmos 1549	1984 040A	USSR	Apr 19	Plesetsk	SL-4	6,300	92.2	356	415	72.9	Military photo recon, recovered 5/3
Gorizont 9	1984 041A	USSR	Apr 22	Tyuratam	SL-12	2,000	1,436.2	35,782	35,793	2.0	TV, telephone, telegraph communications, located above 53 deg. e long.
Progress 21	1984 042A	USSR	May 7	Tyuratam	SL-4	7,020	90.4	276	317	51.6	Resupplied Salyut 7, docked 5/10, undocked and reentered 5/26
Kosmos 1550	1984 043A	USSR	May 11	Plesetsk	SL-8	810	104.9	970	1,010	83.0	Navigation, replaced Kosmos 1535
Kosmos 1551	1984 044A	USSR	May 11	Plesetsk	SL-4	6,300	89.2	212	258	72.8	Military photo recon, recovered 5/23
Kosmos 1552	1984 045A	USSR	May 14	Tyuratam	SL-4	6,700	89.5	182	322	64.9	Military photo recon, recovered 11/3
Kosmos 1553	1984 046A	USSR	May 17	Plesetsk	SL-8	810	104.7	957	1,007	82.9	Navigation, replaced Kosmos 1383
Kosmos 1554	1984 047A	USSR	May 19	Tyuratam	SL-12	—	675.7	19,090	19,168	65.5	Glonass navigation system
Kosmos 1555	1984 047B	USSR	May 19	Tyuratam	SL-12	—	675.7	19,104	19,154	65.5	Glonass navigation system
Kosmos 1556	1984 047C	USSR	May 19	Tyuratam	SL-12	—	676.3	19,130	19,158	65.5	Glonass navigation system
Kosmos 1557	1984 048A	USSR	May 22	Plesetsk	SL-4	6,300	89.0	211	247	82.3	Earth resources photo recon, recovered 6/4
Spacenet 1	1984 049A	US/ESA	May 23	Kourou	Ariane 1	705	1,436.2	35,785	35,790	0.0	Communications satellite located above 120 deg. w long.

*Remote Manipulator System

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1558	1984 050A	USSR	May 25	Plesetsk	SL-4	6,700	89.6	172	341	67.1	Military photo recon, recovered 7/8
Progress 22	1984 051A	USSR	May 28	Tyuratam	SL-4	7,020	91.4	334	358	51.6	Resupplied Salyut 7, docked 5/30, undocked and reentered 7/15
Kosmos 1559	1984 052A	USSR	May 28	Plesetsk	SL-8	40	115.7	1,468	1,508	74.0	Military communications
Kosmos 1560	1984 052B	USSR	May 28	Plesetsk	SL-8	40	115.5	1,469	1,490	74.0	Military communications
Kosmos 1561	1984 052C	USSR	May 28	Plesetsk	SL-8	40	115.4	1,460	1,483	74.0	Military communications
Kosmos 1562	1984 052D	USSR	May 28	Plesetsk	SL-8	40	115.2	1,450	1,476	74.0	Military communications
Kosmos 1563	1984 052E	USSR	May 28	Plesetsk	SL-8	40	115.0	1,436	1,475	74.0	Military communications
Kosmos 1564	1984 052F	USSR	May 28	Plesetsk	SL-8	40	114.8	1,422	1,474	74.0	Military communications
Kosmos 1565	1984 052G	USSR	May 28	Plesetsk	SL-8	40	114.7	1,406	1,474	74.0	Military communications
Kosmos 1566	1984 052H	USSR	May 28	Plesetsk	SL-8	40	114.5	1,392	1,473	74.0	Military communications
Kosmos 1567	1984 053A	USSR	May 30	Tyuratam	SL-11	—	91.8	353	369	65.0	Ocean surveillance. Decayed 4/3/88
Kosmos 1568	1984 054A	USSR	Jun 1	Plesetsk	SL-4	6,300	92.2	357	414	72.8	Military photo recon, recovered 6/14
Kosmos 1569	1984 055A	USSR	Jun 6	Plesetsk	SL-6	1,250	717.8	1,167	38,738	65.7	Early warning, replaced Kosmos 1518
Kosmos 1570	1984 056A	USSR	Jun 8	Plesetsk	SL-8	750	100.8	787	807	74.1	Communications, replaced Kosmos 1452
Intelsat VA-9	1984 057A	ITSO	Jun 9	ESMC	Atlas Centaur	1,091	98.5	176	1,215	29.1	Communications, early shutdown of Centaur stage left satellite in incorrect orbit, decayed 10/24
Kosmos 1571	1984 058A	USSR	Jun 11	Tyuratam	SL-4	6,300	92.1	348	415	70.0	Military photo recon, recovered 6/26
Navstar 9	1984 059A	US	Jun 13	WSMC	Atlas E	433	718.0	20,127	20,236	62.8	Navigation satellite
Kosmos 1572	1984 060A	USSR	Jun 15	Plesetsk	SL-4	6,300	89.8	259	273	82.3	Earth resources photo recon, recovered 6/26
Kosmos 1573	1984 061A	USSR	Jun 19	Plesetsk	SL-4	6,300	89.9	229	312	72.8	Military photo recon, recovered 6/28
Kosmos 1574	1984 062A	USSR	Jun 21	Plesetsk	SL-8	810	104.8	965	1,065	83.0	Navigation, replaced Kosmos 1339
Raduga 15	1984 063A	USSR	Jun 22	Tyuratam	SL-12	—	1,436.0	35,776	35,790	1.9	Domestic communications, stationed above 128 deg. e long.
Kosmos 1575	1984 064A	USSR	Jun 22	Plesetsk	SL-4	6,300	89.8	258	274	82.3	Earth resources photo recon, recovered 7/7

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
USA 2	1984 065A	US	Jun 25	WSMC	Titan 34D	13,300	88.9	170	230	96.1	Decayed 10/18
USA 3	1984 065C	US	Jun 25	WSMC	Titan 34D		Elements not available				In orbit
Kosmos 1576	1984 066A	USSR	Jun 26	Plesetsk	SL-4	6,700	89.7	170	351	67.1	Military photo recon, recovered 8/24
Kosmos 1577	1984 067A	USSR	Jun 27	Plesetsk	SL-8	810	104.7	955	1,008	83.0	Navigation, replaced Kosmos 1464
Kosmos 1578	1984 068A	USSR	Jun 28	Kapustin Yar	SL-8	550	103.2	293	1,525	50.7	Minor military
Kosmos 1579	1984 069A	USSR	Jun 29	Tyuratam	SL-11	—	103.9	906	979	65.0	Ocean surveillance, placed in storage orbit 9/27
Kosmos 1580	1984 070A	USSR	Jun 29	Plesetsk	SL-4	6,300	89.49	228	271	62.8	Photo recon, recovered 7/13
Kosmos 1581	1984 071A	USSR	Jul 3	Plesetsk	SL-6	1,250	721.1	2,375	38,143	65.2	Early warning, replaced Kosmos 1317
Meteor 2-11	1984 072A	USSR	Jul 5	Plesetsk	SL-14	2,750	104.0	939	958	82.5	Meteorological; imaging cloud cover, earth surface
Soyuz T-12	1984 073A	USSR	Jul 17	Tyuratam	SL-4	7,020	91.42	334	354	51.6	Crew: Vladimir Dzhanibekov, Svetlana Savitskaya, Igor Volk; Docked with Salyut 7, 7/18, undocked and reentered 7/29. Flight time: 11 days, 19 hr, 14 mn
Kosmos 1582	1984 074A	USSR	Jul 19	Plesetsk	SL-4	6,300	89.8	253	280	82.3	Earth resources photo recon, recovered 8/2
Kosmos 1583	1984 075A	USSR	Jul 24	Plesetsk	SL-4	6,300	92.2	357	415	72.8	Photo recon, recovered 8/8
Kosmos 1584	1984 076A	USSR	Jul 27	Plesetsk	SL-4	6,300	89.9	180	364	82.3	Earth resources photo recon, recovered 8/10
Kosmos 1585	1984 077A	USSR	Jul 31	Tyuratam	SL-4	6,700	89.2	174	302	64.7	Military photo recon, recovered 9/28
Gorizont 10	1984 078A	USSR	Aug 1	Tyuratam	SL-12	2,000	1,436.2	35,776	35,800	1.6	TV, telephone, telegraph communications, positioned above 80 deg. e long.
Kosmos 1586	1984 079A	USSR	Aug 2	Plesetsk	SL-6	2,000	718.0	1,451	38,914	64.2	Early warning, replaced Kosmos 1456
GMS 3 (Himawari 3)	1984 080A	Japan	Aug 2	Tanegashima	N-II	303	1,436.0	35,783	35,787	0.8	Meteorological imaging, also studying protons, electrons, alpha particles in satellite region; positioned above 140 deg. e long.
ECS 2	1984 081A	ESA	Aug 4	Kourou	Ariane 3	700	1,436.1	35,771	35,802	0.1	TV, telephone communications, positioned above 7 deg. e long.
Telecom 1A	1984 081B	France	Aug 4	Kourou	Ariane 3	690	1,436.2	35,749	35,827	0.0	Domestic and military communications, positioned above 8 deg. w long.

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1587	1984 082A	USSR	Aug 6	Plesetsk	SL-4	6,300	90.1	197	368	72.8	Military photo recon, maneuvered 8/18, recovered 8/31
Kosmos 1588	1984 083A	USSR	Aug 7	Tyuratam	SL-11	—	93.1	410	439	65.0	Ocean surveillance. Decayed 2/17/88. Exploded 2/23/86, 46 pieces. Decayed 2/17/88
Kosmos 1589	1984 084A	USSR	Aug 8	Plesetsk	SL-14	—	115.9	1,491	1,499	82.6	Geodetic
Molniya 1-61	1984 085A	USSR	Aug 10	Plesetsk	SL-6	1,800	717.7	1,125	39,227	63.1	TV, telephone, telegraph communications, replaced Molniya 1-53
Progress 23	1984 086A	USSR	Aug 14	Tyuratam	SL-4	7,020	91.6	341	369	51.6	Resupplied Salyut 7, docked 8/16, undocked 8/26, reentered 8/28
Kosmos 1590	1984 087A	USSR	Aug 16	Plesetsk	SL-4	6,300	89.8	261	270	82.3	Earth resources photo recon, recovered 8/30
CCE (Ampte 1)	1984 088A	US	Aug 16	ESMC	Delta	242	939.4	974	49,817	3.8	Charge Composition Explorer, detects tracer ions released into magnetosphere by IRM satellite
IRM (Ampte 2)	1984 088B	FRG	Aug 16	ESMC	Delta	605	2,653.4	402	113,818	27.0	Releases lithium, barium ions which interact with magnetosphere and are detected by US and UK Ampte satellites
UKS (Ampte 3)	1984 088C	UK	Aug 16	ESMC	Delta	77	2,659.6	1,002	113,417	26.9	Measures disturbances in magnetosphere caused by ions released from Ampte 2
Molniya 1-62	1984 089A	USSR	Aug 24	Plesetsk	SL-6	1,800	717.9	1,514	38,845	63.7	TV, telephone, telegraph communications, replaced Molniya 1-54
Ekran 13	1984 090A	USSR	Aug 24	Tyuratam	SL-12	2,000	1,435.7	30,376	41,180	2.0	TV transmission to remote areas, located above 99 deg. e long.
USA 4	1984 91A	US	Aug 28	WSMC	Titan IIIB	—	Elements not available				In orbit
Kosmos 1591	1984 092A	USSR	Aug 30	Plesetsk	SL-4	6,300	89.8	259	272	82.3	Earth resources photo recon, recovered 9/13
STS 41-D	1984 093A	US	Aug 30	KSC	Discovery	21,524*	90.4	331	331	28.4	Crew: Henry Hartsfield, Michael Coats, Steven Hawley, Richard Mullane, Judith Resnik, Charles Walker; Launched 3 satellites, tested solar array, returned 9/5 after 6 days, 56 mns

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
SBS 4	1984 093B	US	Aug 31	STS	PAM-D	1,117	1,436.2	35,784	35,795	0.0	Commercial communications, positioned above 101 deg. w long.
Leasat 1 (Syncom IV-2)	1984 093C	US	Aug 31	STS	PKM*	1,315**	1,436.0	35,783	35,791	0.7	Military communications, located above 105 deg. w long.
Telstar 3C	1984 093D	US	Sep 1	STS	PAM-D	1,225	1,426.1	35,782	35,791	0.0	Communications, stationed above 125 deg. w long.
Kosmos 1592	1984 094A	USSR	Sep 4	Plesetsk	SL-4	6,000	89.7	233	295	72.8	Military photo recon, recovered 9/18
Kosmos 1593	1984 095A	USSR	Sep 4	Tyuratam	SL-12	700	675.7	19,091	19,167	64.8	Glonass navigation system
Kosmos 1594	1984 095B	USSR	Sep 4	Tyuratam	SL-12	700	677.2	19,139	19,193	64.7	Glonass navigation system
Kosmos 1595	1984 095C	USSR	Sep 4	Tyuratam	SL-12	700	675.7	19,086	19,172	64.7	Glonass navigation system
Kosmos 1596	1984 096A	USSR	Sep 7	Plesetsk	SL-6	2,000	717.7	2,426	37,924	63.8	Early warning, replaced Kosmos 1348
Navstar 10	1984 097A	US	Sep 8	WSMC	Atlas E	770	718.8	19,950	20,411	63.5	Navigation
PRC 16	1984 098A	PRC	Sep 12	Shuang Cheng tzu	CZ-2	2,500	90.2	174	400	67.9	Photo recon, recovered 9/29
Kosmos 1597	1984 099A	USSR	Sep 13	Plesetsk	SL-4	5,900	89.0	211	244	82.3	Earth resources photo recon, recovered 9/26
Kosmos 1598	1984 100A	USSR	Sep 13	Plesetsk	SL-8	810	104.9	964	1,015	82.9	Navigation, replaced Kosmos 1550
Galaxy 3	1984 101A	US	Sep 21	ESMC	Delta	1,218	1,436.2	35,782	35,793	0.0	Commercial communications, positioned above 93.5 deg. w long.
Kosmos 1599	1984 102A	USSR	Sep 25	Plesetsk	SL-4	6,700	89.4	179	319	67.1	Photo recon, recovered 11/20
Kosmos 1600	1984 103A	USSR	Sep 27	Tyuratam	SL-4	6,300	92.2	349	416	69.9	Photo recon, recovered 10/11
Kosmos 1601	1984 104A	USSR	Sep 27	Tyuratam	SL-8	—	94.2	460	501	65.8	Minor military. Decayed 11/29/89
Kosmos 1602	1984 105A	USSR	Sep 28	Plesetsk	SL-14	2,000	97.7	629	664	82.5	Remote ocean sensing
Kosmos 1603	1984 106A	USSR	Sep 28	Tyuratam	SL-12	—	101.9	836	864	71.0	Maneuvered 3 times; possible launch vehicle propulsion test
Kosmos 1604	1984 107A	USSR	Oct 4	Plesetsk	SL-6	2,500	718.0	2,456	37,909	63.2	Early warning, replaced Kosmos 1367

*Perigee Kick Motor

**When fuel is depleted

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
STS 41-G	1984 108A	US	Oct 5	KSC	Challenger	10,629*	91.5	352	352	57.0	Crew: Robert Crippen, Jon McBride, David Leestma, Kathryn Sullivan, Sally Ride, Paul Scully-Power, Marc Garneau; performed high resolution terrain imagery, launched 1 satellite, first EVA by U.S. woman astronaut, returned 10/13 after 8 days, 5 hrs, 23 mns
ERBS	1984 108B	US	Oct 5	STS	RMS**	226	96.8	601	605	57.0	Earth Radiation Budget Satellite, studying solar radiation energy
Kosmos 1605	1984 109A	USSR	Oct 11	Plesetsk	SL-8	810	104.7	947	1,017	82.9	Navigation, replaced Kosmos 1459
Nova 2	1984 110A	US	Oct 12	WSMC	Scout	165	108.9	1,150	1,198	90.1	Navigation
Kosmos 1606	1984 111A	USSR	Oct 18	Plesetsk	SL-14	2,000	97.6	628	661	82.5	Elint, replaced Kosmos 1455
Kosmos 1607	1984 112A	USSR	Oct 31	Tyuratam	SL-11	—	104.1	907	995	65.0	Military ocean surveillance
STS 51-A	1984 113A	US	Nov 8	KSC	Discovery	20,523*	91.5	361	361	28.4	Crew: Frederick Hauck, David Walker, Anna Fisher, Joseph Allen, Dale Gardner; Recovered Westar VI, Palapa B2, launched 2 satellites, returned 11/16 after 7 days, 23 hrs, 45 mns
Anik D-2	1984 113B	Canada	Nov 9	STS	PAM-D	1,100	1,436.1	35,779	35,795	0.0	Domestic communications, located above 111.5 deg. w long. Moved to 82w in 1991
Leasat 2 (Syncom IV-1)	1984 113C	US	Nov 10	STS	PKM†	1,315††	1,436.0	35,679	35,890	0.9	Military communications, positioned above 105 deg. w long.
Spacenet 2	1984 114A	US	Nov 10	Kourou	Ariane 3	705	1,436.2	35,780	35,795	0.0	Commercial communications, stationed above 68 deg. w long.
Marecs B2	1984 114B	ESA	Nov 10	Kourou	Ariane 3	563	1,436.2	35,799	35,799	2.0	Maritime communications, positioned above 177.5 deg. e long.

*Payload weight
**Remote Manipulator System
†Perigee Kick Motor
††When fuel is depleted

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Nato 3D	1984 115A	NATO	Nov 14	ESMC	Delta	320	1,436.1	35,785	35,795	3.2	Military communications, located above 138 deg. w long.
Kosmos 1608	1984 116A	USSR	Nov 14	Tyuratam	SL-4	6,700	88.9	197	251	69.9	Military photo recon, recovered 12/17
Kosmos 1609	1984 117A	USSR	Nov 14	Plesetsk	SL-4	6,300	92.2	356	414	72.8	Military photo recon, recovered 11/28
Kosmos 1610	1984 118A	USSR	Nov 15	Plesetsk	SL-8	810	104.9	964	1,010	82.9	Navigation, replaced Kosmos 1531
Kosmos 1611	1984 119A	USSR	Nov 21	Tyuratam	SL-4	6,700	89.7	173	351	64.7	Military photo recon, recovered or decayed 1/11/85
Kosmos 1612	1984 120A	USSR	Nov 27	Plesetsk	SL-14	2,200	98.4	135	1,230	82.6	Launch vehicle failed to shut down at perigee, casting spacecraft into unusable orbit. Decayed 1/31/85
Kosmos 1613	1984 121A	USSR	Nov 29	Plesetsk	SL-4	6,300	90.0	197	356	72.8	Military photo recon, recovered 12/24
USA 6	1984 122A	US	Dec 4	WSMC	Titan 34D	13,000	Elements not availableIn orbit				
NOAA 9	1984 123A	US	Dec 12	WSMC	Atlas E	1,712	102.0	841	862	99.0	Meteorological, polar orbit
Molniya 1-63	1984 124A	USSR	Dec 14	Plesetsk	SL-6	1,800	717.8	1,997	38,358	63.2	TV, telephone, telegraph communications, replaced Molniya 1-55
Vega 1	1984 125A	USSR	Dec 15	Tyuratam	SL-12	4,000	Heliocentric orbit				Joint mission to Venus/Comet Halley. Reached Venus, 6/10/85, deployed lander/atmospheric balloon; Comet Halley encounter 3/6/86
Kosmos 1614	1984 126A	USSR	Dec 19	Kapustin Yar	SL-8	1,000	88.4	176	223	50.6	Space plane recovery test, landed in Black Sea after 1 orbit
Kosmos 1615	1984 127A	USSR	Dec 20	Plesetsk	SL-8	—	94.0	436	481	65.8	Minor military. Decayed 4/15/90
Vega 2	1984 128A	USSR	Dec 21	Tyuratam	SL-12	4,000	Heliocentric orbit				Joint Venus/Comet Halley probe. Reached Venus 6/14/85, ejected Lander/atmospheric balloon; Comet Halley encounter 3/9/86
USA 7	1984 129A	US	Dec 22	ESMC	Titan 34D	—	Elements not available				In orbit
Sakigake (MS-T5)	1985 01A	Japan	Jan 7	Kagoshima	Mu-3S	141	Heliocentric Orbit				Encountered Comet Halley 3/86
Kosmos 1616	1985 02A	USSR	Jan 9	Tyuratam	SL-4	6,700	89.9	172	358	64.8	Military photo recon. Decayed 3/4

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1617	1985 03A	USSR	Jan 15	Plesetsk	SL-14	40	114.0	1,410	1,412	82.6	Kosmos 1617-1622 new satellite series, mission unknown
Kosmos 1618	1985 03B	USSR	Jan 15	Plesetsk	SL-14	40	114.0	1,405	1,411	82.6	
Kosmos 1619	1985 03C	USSR	Jan 15	Plesetsk	SL-14	40	113.7	1,381	1,410	82.6	
Kosmos 1620	1985 03D	USSR	Jan 15	Plesetsk	SL-14	40	113.8	1,388	1,410	82.6	
Kosmos 1621	1985 03E	USSR	Jan 15	Plesetsk	SL-14	40	113.8	1,393	1,410	82.6	
Kosmos 1622	1985 03F	USSR	Jan 15	Plesetsk	SL-14	40	113.9	1,398	1,411	82.6	
Molniya 3-23	1985 04A	USSR	Jan 16	Plesetsk	SL-6	1,800	717.8	399	39,957	64.6	TV, telephone, telegraph communications, replaced Molniya 3-19
Kosmos 1623	1985 05A	USSR	Jan 16	Tyuratam	SL-4	6,300	92.2	332	427	70.0	Military photo recon, recovered 1/30
Kosmos 1624	1985 06A	USSR	Jan 17	Plesetsk	SL-8	700	100.7	782	804	74.0	Military communications; replaced Kosmos 1570
Gorizont 11	1985 07A	USSR	Jan 18	Tyuratam	SL-12	2,000	1,436.1	35,767	35,807	1.2	TV, telephone, telegraph comm, positioned above 140 deg. e long.
Kosmos 1625	1985 08A	USSR	Jan 23	Tyuratam	SL-11	—	89.3	111	368	65.0	Ocean surveillance; decayed 1/25
Kosmos 1626	1985 09A	USSR	Jan 24	Plesetsk	SL-14	2,200	97.6	626	661	82.5	Elint; replaced Kosmos 1408
STS-51C	1985 010A	US	Jan 24	KSC	Discovery	—	91.3	341	341	28.4	Crew: Thomas Mattingly, Loren Shriver, Ellison Onizuka, James Buchli, Gary Payton. Launched military payload; returned 1/27 after 3 days, 1 hr, 33 mns.
USA 8	1985 010B	US	Jan 24	STS	IUS		Elements not available				In orbit
Kosmos 1627	1985 011A	USSR	Feb 1	Plesetsk	SL-8	810	104.8	952	1,017	82.9	Navigation; replaced Kosmos 1448
Kosmos 1628	1985 012A	USSR	Feb 6	Plesetsk	SL-4	6,300	92.3	355	415	72.8	Military photo recon, recovered 2/20
Meteor 2-12	1985 013A	USSR	Feb 6	Plestesk	SL-14	2,200	104.0	934	960	82.5	Meteorological; remote sensing
USA 9	1985 014A	US	Feb 8	WSMC	Titan IIIB	—	Elements not available				In orbit
Arabsat 1	1985 015A	SA	Feb 8	Kourou	Ariane 3	532	1436.1	35,753	35,819	0.1	Communications coverage for North Africa, Middle East; located above 19 deg. e long.

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Brasilsat 1	1985 015B	Brazil	Feb 8	Kourou	Ariane 3	671	1436.2	35,787	35,790	0.1	Domestic communications; stationed above 65 deg. w long.
Kosmos 1629	1985 016A	USSR	Feb 21	Tyuratam	SL-12	—	1437.7	35,806	35,827	1.3	Developmental military communications (?), stationed above 335 deg. e long.
Kosmos 1630	1985 017A	USSR	Feb 27	Tyuratam	SL-4	6,700	89.6	174	334	64.8	Military photo recon, maneuverable, recovered 4/23
Kosmos 1631	1985 018A	USSR	Feb 27	Plesetsk	SL-8	—	94.4	472	495	65.9	Radar calibration (?). Decayed 4/15/90
Kosmos 1632	1985 019A	USSR	Mar 1	Plesetsk	SL-4	6,300	89.3	211	268	72.8	Military photo recon; maneuvered extensively; recovered 3/15
Kosmos 1633	1985 020A	USSR	Mar 5	Plesetsk	SL-14	2,200	97.6	631	656	82.5	Elint; replaced Kosmos 1470
Geosat	1985 021A	US	Mar 13	ESMC	Atlas E	635	100.5	782	786	108.0	Ocean mapping, replaces data lost due to premature shutdown of Seasat
Kosmos 1634	1985 022A	USSR	Mar 14	Plesetsk	SL-8	810	104.8	957	1,008	82.9	Navigation; replaced Kosmos 1513
Kosmos 1635	1985 023A	USSR	Mar 21	Plesetsk	SL-8	40	115.8	1,471	1,511	74.1	Tactical communications
Kosmos 1636	1985 023B	USSR	Mar 21	Plesetsk	SL-8	40	115.6	1,472	1,493	74.1	Tactical communications
Kosmos 1637	1985 023C	USSR	Mar 21	Plesetsk	SL-8	40	115.4	1,463	1,486	74.1	Tactical communications
Kosmos 1638	1985 023D	USSR	Mar 21	Plesetsk	SL-8	40	115.2	1,454	1,478	74.1	Tactical communications
Kosmos 1639	1985 023E	USSR	Mar 21	Plesetsk	SL-8	40	115.1	1,439	1,478	74.1	Tactical communications
Kosmos 1640	1985 023F	USSR	Mar 21	Plesetsk	SL-8	40	114.9	1,425	1,477	74.1	Tactical communications
Kosmos 1641	1985 023G	USSR	Mar 21	Plesetsk	SL-8	40	114.8	1,410	1,478	74.1	Tactical communications
Kosmos 1642	1985 023H	USSR	Mar 21	Plesetsk	SL-8	40	114.6	1,397	1.476	74.1	Tactical communications
Ekran 14	1985 024A	USSR	Mar 22	Tyuratam	SL-12	2,000	1,479.0	30,642	42,600	0.4	TV transmission to remote areas, located above 99 deg. e long.
Intelsat VA-10	1985 025A	ITSO	Mar 22	ESMC	Altas Centaur	2,013	1,436.2	35,767	35,812	0.0	Communications, in geosynchronous orbit above the Atlantic
Kosmos 1643	1985 026A	USSR	Mar 25	Tyuratam	SL-4	6,700	89.2	212	252	64.7	Military photo recon, maneuverable, recovered 10/18
Kosmos 1644	1985 027A	USSR	Apr 3	Tyuratam	SL-4	6,300	92.2	349	415	70.3	Military photo recon, recovered 4/17

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
STS 51-D	1985 028A	US	Apr 12	KSC	Discovery	16,228*	92.1	463	463	28.5	Crew: Karol Bobko, Donald Williams, Rhea Seddon, S. David Griggs, Jeffrey A. Hoffman, Senator Jake Garn, Charles D. Walker. Launched two satellites; landed 4/19, after 6 days, 23 hrs, 56 mns.
Anik C-1	1985 028B	Canada	Apr 13	STS	PAM-D	1,238	1436.0	35,777	35,798	0.3	Last in series of 3 communications satellites for Telesat Canada; placed in storage orbit at 107.5 deg. w long.
Leasat 3 (Syncom IV-3)	1985 028C	US	Apr 13	STS	PKM**	1,315†	1,436.2	35,768	35,809	1.4	Military communications. Stranded in low-earth orbit when PKM failed to fire after deployment; Repaired on orbit 8/31-9/1; PKM fired 10/27. Operational above 178 deg. e long.
None	None	USSR	Apr 13	Tyuratam	SL-16	—	—	—	—	—	1st launch. No orbit
Kosmos 1645	1985 029A	USSR	Apr 16	Plesetsk	SL-4	5,700	90.5	390	215	62.8	Scientific experiments; recovered 4/29
Kosmos 1646	1985 030A	USSR	Apr 18	Tyuratam	SL-11	—	92.3	378	399	65.0	Ocean surveillance. Decayed 5/2/88
Kosmos 1647	1985 031A	USSR	Apr 19	Plesetsk	SL-4	6,700	89.4	161	327	67.1	Military photo recon, recovered 6/ll
Kosmos 1648	1985 032A	USSR	Apr 25	Plesetsk	SL-4	6,300	90.1	229	327	82.3	Photo recon, recovered 5/6
Prognoz 10	1985 033A	USSR	Apr 26	Tyuratam	SL-6	1,000	5,783	5,095	194,734	76.8	Soviet/Czech mission studying magnetosphere and solar wind
STS 51-B	1985 034A	US	Apr 29	KSC	Challenger	14,227*	91.5	352	352	57.0	Crew: Robert Overmyer, Frederick Gregory, Don Lind, William Thornton, Taylor Wang, Norman Thagard, Lodewijk van den Berg. Carried Spacelab 3, one subsatellite deployed. Landed 5/6 after 7 days, 9 mns.
Nusat	1985 034B	US	Apr 29	STS	—	52	91.1	318	339	57.0	Air traffic control radar calibration. Decayed 12/15/86
GSTAR-1	1985 035A	US	May 8	Kourou	Ariane 3	705	1436.2	35,778	35,799	0.0	U.S. domestic communications; stationed above 103 deg. w long.

*Payload weight

**Perigee Kick Motor

†When fuel is depleted

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Telecom 1B	1985 035B	France	May 8	Kourou	Ariane 3	690	1436.2	35,771	35,804	0.1	French business communications satellite positioned above 5 deg. w long.
Kosmos 1649	1985 036A	USSR	May 15	Plesetsk	SL-4	6,300	92.3	356	415	72.8	Military photo recon; recovered 5/29
Kosmos 1650	1985 037A	USSR	May 17	Tyuratam	SL-12	600	675.7	19,084	19,174	64.8	Glonass nagivation system
Kosmos 1651	1985 037B	USSR	May 17	Tyuratam	SL-12	600	675.7	19,118	19,140	64.8	Glonass navigation system
Kosmos 1652	1985 037C	USSR	May 17	Tyuratam	SL-12	600	675.8	19,117	19,147	64.8	Glonass navigation system
Kosmos 1653	1985 038A	USSR	May 22	Plesetsk	SL-4	6,300	89.5	209	294	82.3	Earth resources photo recon, recovered 6/5
Kosmos 1654	1985 039A	USSR	May 23	Tyuratam	SL-4	6,700	89.6	172	343	64.8	Military photo recon, disintegrated 6/21, 19 pieces
Molniya 3-24	1985 040A	USSR	May 29	Plesetsk	SL-6	1,800	717.6	1,822	38,523	63.1	Domestic communications; replaced Molniya 3-18
Kosmos 1655	1985 041A	USSR	May 30	Plesetsk	SL-8	810	105.0	973	1,015	83.0	Navigation; replaced Kosmos 1447
Kosmos 1656	1985 042A	USSR	May 30	Tyuratam	SL-12	—	101.5	803	859	71.1	Elint; maneuvered; new satellite system formation?
Soyuz T-13	1985 043A	USSR	Jun 6	Tyuratam	SL-4	6,850	91.6	356	359	51.6	Crew: Vladimir Dzhanibekov, Viktor Savinykh. Docked w/ inert Salyut 7,6/8; Cosmonauts resurrected station. T-13 returned 9/25 w/ Dzhanibekov and Georgi Grechko (Soyuz T-14), marking 1st crew rotation in space. Flight time: 112 days, 3 hr, 12 mn.
Kosmos 1657	1985 044A	USSR	Jun 7	Plesetsk	SL-4	6,300	89.2	182	284	82.2	Earth resources photo recon, recovered 6/21
Kosmos 1658	1985 045A	USSR	Jun 11	Plesetsk	SL-6	1,250	718.9	1,230	39,182	63.7	Early warning; replaced Kosmos 1481
Kosmos 1659	1985 046A	USSR	Jun 13	Plesetsk	SL-4	6,300	92.3	357	415	72.9	Military photo recon, recovered 6/27
Kosmos 1660	1985 047A	USSR	Jun 14	Plesetsk	SL-14	600	116.0	1,480	1,523	73.6	Geodetic
STS 51-G	1985 048A	US	Jun 17	KSC	Discovery	20,148*	91.8	383	383	28.4	Crew: Daniel Brandenstein, John Creighton, John Fabian, Shannon Lucid, Stephen Nagel, Patrick Baudry, Sultan Salman Abdelazizi Al-Saud. Launched 3 satellites, 1 research platform; carried French biomedical experiments; returned 6/24 after 7 days 1 hr, 39 mns.

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Morelos 1	1985 048B	Mexico	Jun 17	STS	PAM-D	512	1,436.1	35,776	35,798	0.0	Domestic communications, positioned above 113.5 deg. w long.
Arabsat 1B	1985 048C	SA	Jun 18	STS	PAM-D	592	1,436.2	35,768	35,807	0.0	Communications coverage for North Africa, Middle East, located above 26 deg. e long.
Telstar 3D	1985 048D	US	Jun 19	STS	PAM-D	630	1,436.1	35,770	35,804	0.0	Commercial comm, located above 76 deg. w long.
Spartan 1	1985 048E	US	Jun 20	STS	RMS*	1,008	91.82	355	391	28.4	Astronomical research platform, short-term free-flier. Retrieved 6/22
Kosmos 1661	1985 049A	USSR	Jun 18	Plesetsk	SL-6	1,250	718.2	2,126	38,248	63.1	Early warning; maneuverable
Kosmos 1662	1985 050A	USSR	Jun 19	Plesetsk	SL-8	—	94.3	465	500	65.8	Minor military. Decayed 11/16/89
Progress 24	1985 051A	USSR	Jun 21	Tyuratam	SL-4	7,020	91.6	354	360	51.6	Resupplied Salyut 7; docked 6/23; undocked and reentered 7/15
Kosmos 1663	1985 052A	USSR	Jun 21	Plesetsk	SL-4	6,300	89.8	257	274	82.3	Earth resources photo recon; recovered 7/5
Unannounced	1985 053A	USSR	Jun 21	Tyuratam	SL-16	—	89.8	195	340	64.4	Payload failed to orbit; debris decayed w/in 7 days; no U.N. registration. New launch vehicle
Kosmos 1664	1985 054A	USSR	Jun 26	Plesetsk	SL-4	6,300	89.34	211	268	72.8	Military photo recon, maneuvered, decayed 7/5
Intelsat VA-11	1985 055A	ITSO	Jun 30	EMSC	Atlas Centaur	1,098	1,436.2	35,771	35,805	0.0	Communications. In geosynchronous orbit over Indian Ocean
Giotto	1985 056A	ESA	Jul 2	Kourou	Ariane 1	512		Heliocentric orbit			Scientific satellite; encountered Comet Halley 3/13/86
Kosmos 1665	1985 057A	USSR	Jul 3	Plesetsk	SL-4	6,300	89.7	225	290	72.8	Military photo recon, recovered 7/17
Kosmos 1666	1985 058A	USSR	Jul 8	Plesetsk	SL-14	1,500	97.7	628	664	82.5	Elint
Kosmos 1667	1985 059A	USSR	Jul 10	Plesetsk	SL-4	5,700	89.3	211	270	82.3	Biological research, carried 2 monkeys, recovered 7/17
Kosmos 1668	1985 060A	USSR	Jul 15	Tyuratam	SL-4	6,300	89.6	230	281	70.3	Military photo recon, recovered 7/29
Molniya 3-25	1985 061A	USSR	Jul 17	Plesetsk	SL-6	1,800	717.8	1,238	39,114	62.9	TV, telephone, telegraph communications

*Remote Manipulator System

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1669	1985 062A	USSR	Jul 19	Tyuratam	SL-4	7,020	91.0	298	358	51.6	Test flight of new modified Progress vehicle; resupplied Salyut 7; docked 7/21; undocked 8/29, reentered 8/30
STS 51-F	1985 063A	US	Jul 29	KSC	Challenger	15,583*	90.9	322	322	49.4	Crew: Gordon Fullerton, Roy Bridges, Karl Henize, F. Story Musgrave, Anthony England, Loren Acton, John-David Bartoe; Carried Spacelab 2, deployed 1 subsatellite; returned 8/6 after 7 days, 22 hrs, 46 mns.
PDP	1985 063B	US	Aug 1	STS	RMS**	285	90.9	312	321	49.4	Plasma Diagnostics Package. Flew alongside shuttle for few hours, retrieved 8/2. Other experiments conducted while attached to RMS
Kosmos 1670	1985 064A	USSR	Aug 1	Tyuratam	SL-11	4,540	104.1	897	1,006	65.0	Nuclear powered recon; in storage orbit
Kosmos 1671	1985 065A	USSR	Aug 2	Plesetsk	SL-4	6,300	89.4	228	258	72.8	Military photo recon, recovered 8/16
Transit 19 (Oscar 30)	1985 066A	US	Aug 3	WSMC	Scout	55	107.9	1,001	1,259	89.8	Navigation
Transit 20 (Oscar 24)	1985 066B	US	Aug 3	WSMC	Scout	55	107.9	1,000	1,260	89.8	Navigation
Kosmos 1672	1985 067A	USSR	Aug 7	Plesetsk	SL-4	6,300	89.8	258	273	82.3	Earth resources photo recon, maneuvered, recovered 8/21
Kosmos 1673	1985 068A	USSR	Aug 8	Tyuratam	SL-4	6,700	89.1	202	261	64.8	Military photo recon, recovered 9/19
Kosmos 1674	1985 069A	USSR	Aug 8	Plesetsk	SL-14	1,500	97.6	627	660	82.5	Elint; replaced Kosmos 1536
Raduga 16	1985 070A	USSR	Aug 8	Tyuratam	SL-12	2,000	1,435.9	35,765	35,801	0.9	Domestic communications, positioned above 45 deg. e long.
Kosmos 1675	1985 071A	USSR	Aug 12	Plesetsk	SL-6	1,250	717.7	1,371	38,977	65.0	Early warning; replaced Kosmos 1581
Kosmos 1676	1985 072A	USSR	Aug 16	Plesetsk	SL-4	6,300	89.5	178	317	67.2	Military photo recon, maneuverable, recovered 10/14
Planet A (Suisei)	1985 073A	Japan	Aug 18	Kagoshima	Mu-3SII	141	Heliocentric orbit				Encountered Comet Halley 3/8/86

*Payload weight
**Remote Manipulator System

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Molniya 1-64	1985 074A	USSR	Aug 22	Plesetsk	SL-6	1,800	717.8	979	39,374	63.2	Communications; replaced Molniya 1-61
Kosmos 1677	1985 075A	USSR	Aug 23	Tyuratam	SL-11	4,540	103.9	891	992	64.7	Nuclear powered ocean surveillance; in storage orbit
STS 51-I	1985 076A	US	Aug 27	KSC	Discovery	19,988*	91.6	444	444	28.5	Crew: Joe Engle, Richard Covey, James Van Hoften, William Fisher, Michael Lounge. Launched 3 satellites, repaired Leasat 3, returned 9/3 after 7 days, 2 hrs, 17 mns.
Aussat 1	1985 076B	Aust	Aug 27	STS	PAM-D	655**	1,436.2	35,779	35,795	0.0	Domestic communications, stationed above 158 deg. w long.
ASC 1	1985 076C	US	Aug 27	STS	PAM-D	1,271	1,436.1	35,782	35,791	0.1	Commerical communications, positioned above 127 deg. w long.
Syncom IV-4 (Leasat 4)	1985 076D	US	Aug 29	STS	PKM†	1,388**	1,436.1	35,079	36,493	1.4	Military communications, stationed above 178 deg. e long. UHF contact lost 9/6
Unnannounced	—	US	Aug 28	WMSC	Titan III						Launch failure
Kosmos 1678	1985 077A	USSR	Aug 29	Plesetsk	SL-4	6,300	89.8	258	272	82.3	Earth resources photo recon, recovered 9/12
Kosmos 1679	1985 078A	USSR	Aug 29	Tyuratam	SL-4	6,300	89.6	172	342	64.8	Military photo recon, recovered 10/18
Kosmos 1680	1985 079A	USSR	Sep 4	Plesetsk	SL-8	700	100.7	782	804	74.1	Military communications; replaced Kosmos 1538
Kosmos 1681	1985 080A	USSR	Sep 6	Plesetsk	SL-4	6,300	89.0	219	226	82.3	Earth resources photo recon, recovered 9/19
Spacenet 3	—	US	Sep 13	Kourou	Ariane 3						Launch failure
ECS 3	—	ESA	Sep 13	Kourou	Ariane 3						Launch failure
Soyuz T-14	1985 081A	USSR	Sep 17	Tyuratam	SL-4	6,850	91.3	338	353	51.6	Crew: Vladimir Vasyutin, Georgi Grechko, Aleksandr Volkov; docked w/ Salyut 7, 9/18. Medical emergency required cosmonauts to return, 11/21. Flight time: 64 days, 21 hr, 52 mn
Kosmos 1682	1985 082A	USSR	Sep 19	Tyuratam	SL-11	—	92.4	341	446	65.0	Elint. Exploded 12/18, 23 pieces. Decayed 5/17/88

*Payload Weight
**When Fuel is depleted
†Perigee Kick Motor

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1683	1985 083A	USSR	Sep 19	Plestesk	SL-4	6,300	92.3	356	414	72.8	Military photo recon, recovered 10/4
Kosmos 1684	1985 084A	USSR	Sep 24	Plesetsk	SL-6	1,250	717.8	1,133	39,221	62.7	Early warning; replaced Kosmos 1586
Kosmos 1685	1985 085A	USSR	Sep 27	Plesetsk	SL-4	6,300	92.3	356	416	72.8	Military photo-recon, recovered 10/10
Kosmos 1686	1985 086A	USSR	Sep 27	Tyuratam	SL-13	20,000	94.0	470	471	51.6	Resupplied and enlarged Salyut 7; docked 10/2. Decayed 2/7/91
Intelsat VA-12	1985 087A	ITSO	Sep 29	ESMC	Atlas Centaur	1,096	1,436.1	35,772	35,802	0.0	Telephone communications operating at C and L-band; stationed above 31 deg. e long.
Kosmos 1687	1985 088A	USSR	Sep 30	Plesetsk	SL-6	1,250	718.1	2,081	38,262	63.1	Early warning; replaced Kosmos 1401
Kosmos 1688	1985 089A	USSR	Oct 2	Kapustin Yar	SL-8	550	92.1	320	434	50.7	Minor military. Decayed 7/2/88
Kosmos 1689	1985 090A	USSR	Oct 3	Tyuratam	SL-3	1,500	96.9	568	655	98.0	Earth resources remote sensing
Molniya 3-26	1985 091A	USSR	Oct 3	Plesetsk	SL-6	1,800	717.6	821	39,528	64.3	Domestic communications
STS 51-J	1985 092A	US	Oct 3	KSC	Atlantis	—	93.8	515	515	28.5	Crew: Karol Bobko, Ronald Grabe, David Hilmers, Robert Stewart, William Pailes; DoD mission, launched 2 satellites, landed 10/7 after 4 days, 1 hr., 46 mns.
USA 11	1985 092B	US	Oct 4	STS	IUS	—	Elements not available				In orbit
USA 12	1985 092C	US	Oct 4	STS	IUS	—	Elements not available				In orbit
Navstar 11	1985 093A	US	Oct 9	WSMC	Atlas E	163	717.9	19,887	20,474	63.4	Navigation
Kosmos 1690	1985 094A	USSR	Oct 9	Plesetsk	SL-14	—	113.7	1,381	1,412	82.6	New satellite series, mission similar to Kosmos 1617-1622
Kosmos 1691	1985 094B	USSR	Oct 9	Plesetsk	SL-14	—	114.0	1,409	1,413	82.6	Exploded 11/22, 18 pieces
Kosmos 1692	1985 094C	USSR	Oct 9	Plesetsk	SL-14	—	113.8	1,387	1,413	82.6	
Kosmos 1693	1985 094D	USSR	Oct 9	Plesetsk	SL-14	—	113.8	1,391	1,413	82.6	
Kosmos 1694	1985 094E	USSR	Oct 9	Plesetsk	SL-14	—	113.9	1,396	1,413	82.6	
Kosmos 1695	1985 094F	USSR	Oct 9	Plesetsk	SL-14	—	114.0	1,402	1,414	82.6	
Kosmos 1696	1985 095A	USSR	Oct 16	Tyuratam	SL-4	—	89.6	230	281	70.3	Military photo recon; recovered 10/30

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
PRC 17	1985 096A	PRC	Oct 21	Shuang Cheng Tzu	CZ-2	2,500	90.19	173	395	62.9	Surveyed land resources; capsule recovered 10/26. Spacecraft reentered 11/7
Kosmos 1697	1985 097A	USSR	Oct 22	Tyuratam	SL-16	—	101.9	846	853	71.0	Elint
Kosmos 1698	1985 098A	USSR	Oct 22	Plesetsk	SL-6	1,250	716.8	1,534	38,769	63.1	Early warning; replaced Kosmos 1541
Molniya 1-65	1985 099A	USSR	Oct 23	Tyuratam	SL-6	1,800	717.8	818	39,532	64.5	Communications; replaced Molniya 1-58
Meteor 3-1	1985 100A	USSR	Oct 24	Plesetsk	SL-14	—	109.4	1,185	1,210	82.5	Meteorological; new generation weather satellite
Kosmos 1699	1985 101A	USSR	Oct 25	Plesetsk	SL-4	6,700	89.5	167	339	67.1	Military photo recon; recovered 12/23
Kosmos 1700	1985 102A	USSR	Oct 25	Tyuratam	SL-12	4,000	1,435.6	35,758	35,796	0.6	Communications, data relay(?), stationed above 95 deg. e long.
Molniya 1-66	1985 103A	USSR	Oct 28	Plesetsk	SL-6	1,800	717.8	1,089	39,265	62.9	Communications; replaced Molniya 1-56
STS 61-A	1985 104A	US	Oct 30	KSC	Challenger	14,443*	91.0	331	331	57.0	Crew: Henry Hartsfield, Jr., Steven Nagel, Bonnie Dunbar, Guion Bluford, Jr., Ernst Messerschmid, Reinhard Furrer, Wubbo Ockels, James Buchli. Carried Spacelab SL-13; launched 1 satellite, landed, 11/6 after 7 days, 45 mns.
Glomr	1985 104B	US	Nov 1	STS	—	52	90.9	304	332	57.0	Relayed ground signals. Decayed 12/26/86
Kosmos 1701	1985 105A	USSR	Nov 9	Plesetsk	SL-6	1,250	717.5	1,265	39,074	65.6	Early warning; replaced Kosmos 1675
Kosmos 1702	1985 106A	USSR	Nov 13	Plesetsk	SL-4	6,300	92.2	356	414	72.8	Military photo recon, recovered 11/27
Raduga 17	1985 107A	USSR	Nov 15	Tyuratam	SL-12	2,000	1,436.2	35,788	35,790	1.3	Communications, stationed above 35 deg. e long. Moved to 49 e, 9/91
Kosmos 1703	1985 108A	USSR	Nov 22	Plesetsk	SL-14	—	97.7	630	664	82.5	Elint; replaced Kosmos 1674
STS 61-B	1985 109A	US	Nov 27	KSC	Atlantis	21,762**	91.9	377	377	28.5	Crew: Brewster Shaw, Jr., Bryan O'Connor, Rodolfo Neri Vela, Charles Walker, Mary Cleave, Jerry Ross, Sherwood Spring. Deployed 3 satellites, I experiment, returned, 12/3 after 6 days, 21 hrs., 4 mns.

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Morelos 2	1985 109B	Mexico	Nov 27	STS	PAM-D	645	1,436.1	35,773	35,801	1.1	Domestic communications satellite; in parking orbit
Aussat 2	1985 109C	Aust	Nov 28	STS	PAM-D	1,259	1,436.2	35,786	35,790	0.0	Domestic communications; stationed above 156 deg. e long.
Satcom K2	1985 109D	US	Nov 28	STS	PAM-D	1,812	1,436.2	35,774	35,801	0.0	Communications; positioned above 81 deg. w long.
OEX	1985 109E	US	Nov 30	STS	EVA	16	92.1	371	382	28.5	Shuttle autopilot software test target. Decayed 3/2/87
Kosmos 1704	1985 110A	USSR	Nov 28	Plesetsk	SL-8	810	104.8	961	1,007	82.9	Navigation; replaced Kosmos 1598
Kosmos 1705	1985 111A	USSR	Dec 3	Plesetsk	SL-4	6,300	92.2	356	415	72.8	Military photo recon, recovered 12/17
Kosmos 1706	1985 112A	USSR	Dec 11	Plesetsk	SL-4	6,700	89.4	171	321	72.9	Earth resources photo recon; recovered 2/9/86
Kosmos 1707	1985 113A	USSR	Dec 12	Plesetsk	SL-14	—	97.7	630	662	82.5	Elint; replaced Kosmos 1515
ASAT Target 1	1985 114A	US	Dec 13	WI	Scout	—	95.6	314	776	37.1	Decayed 5/11/89
ASAT Target 2	1985 114B	US	Dec 13	WI	Scout	—	95.5	314	772	37.1	Decayed 8/9/87
Kosmos 1708	1985 115A	USSR	Dec 13	Plesetsk	SL-4	6,300	89.8	257	273	82.2	Military photo recon, recovered 12/27
Kosmos 1709	1985 116A	USSR	Dec 19	Plesetsk	SL-8	810	104.8	959	1,009	82.9	Navigation; replaced Kosmos 1610
Molniya 3-27	1985 117A	USSR	Dec 24	Plesetsk	SL-6	1,800	735.7	1,521	38,834	62.9	Domestic communications
Kosmos 1710	1985 118A	USSR	Dec 24	Tyuratam	SL-12	—	675.7	19,111	19,147	65.2	Glonass navigation system
Kosmos 1711	1985 118B	USSR	Dec 24	Tyuratam	SL-12	—	675.7	19,104	19,154	65.2	Glonass navigation system
Kosmos 1712	1985 118C	USSR	Dec 24	Tyuratam	SL-12	—	676.3	19,136	19,151	65.2	Glonass navigation system
Meteor 2-13	1985 119A	USSR	Dec 26	Plesetsk	SL-14	—	104.0	936	958	82.5	Meteorological
Kosmos 1713	1985 120A	USSR	Dec 27	Plesetsk	SL-4	—	90.6	214	395	62.8	Military photo recon; recovered 1/22/86
Kosmos 1714	1985 121A	USSR	Dec 28	Tyuratam	SL-16		94.5	161	826	71.0	Elint; decayed 2/27/86
Kosmos 1715	1986 001A	USSR	Jan 8	Plesetsk	SL-4	6,000	89.4	226	263	72.8	Photo recon. Recovered 1/22
Kosmos 1716	1986 002A	USSR	Jan 9	Plesetsk	SL-8	40	115.5	1,462	1,490	74.0	Communications; 8-satellite launch
Kosmos 1717	1986 002B	USSR	Jan 9	Plesetsk	SL-8	40	115.8	1,472	1,512	74.0	Communications, Failed 11/27
Kosmos 1718	1986 002C	USSR	Jan 9	Plesetsk	SL-8	40	115.6	1,475	1,497	74.0	Communications

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1719	1986 002D	USSR	Jan 9	Plesetsk	SL-8	40	115.3	1,453	1,482	74.0	Communications
Kosmos 1720	1986 002E	USSR	Jan 9	Plesetsk	SL-8	40	115.1	1,439	1,482	74.0	Communications
Kosmos 1721	1986 002F	USSR	Jan 9	Plesetsk	SL-8	40	115.0	1,425	1,481	74.0	Communications
Kosmos 1722	1986 002G	USSR	Jan 9	Plesetsk	SL-8	40	114.8	1,411	1,481	74.0	Communications
Kosmos 1723	1986 002H	USSR	Jan 9	Plesetsk	SL-8	40	114.6	1,398	1,479	74.0	Communications, Failed 9/12
STS 61-C	1986 003A	US	Jan 12	KSC	Columbia	14,705*	91.3	339	339	28.5	Crew:Robert Gibson, Charles Bolden, Steve Hawley, George Nelson, Robert Cenker, Franklin Chang-Diaz, Bill Nelson; Deployed 1 satellite. Returned 1/18 after 6 days, 2 hrs, 4 mns.
Satcom K-1	1986 003B	US	Jan 12	STS	Pam D2	1,923	1,436.2	35,781	35,794	0.0	Commercial communications. Positioned above 81 deg. w long.
Kosmos 1724	1986 004A	USSR	Jan 15	Plesetsk	SL-4	6,000	89.2	168	334	67.1	Photo recon. Recovered 3/15
Kosmos 1725	1986 005A	USSR	Jan 17	Plesetsk	SL-8	810	104.8	1,001	967	82.9	Navigation. Replaced Kosmos 1577
Kosmos 1726	1986 006A	USSR	Jan 17	Plesetsk	SL-14	2,000	97.6	628	660	82.5	Elint. Replaced Kosmos 1606
Raduga 18	1986 007A	USSR	Jan 17	Tyuratam	SL-12	2,000	1,436.2	35,781	35,797	0.5	Domestic communications. Stationed above 335 deg. e long.
Kosmos 1727	1986 008A	USSR	Jan 23	Plesetsk	SL-8	810	104.8	958	1,013	82.9	Navigation. Replaced Kosmos 1506
Kosmos 1728	1986 009A	USSR	Jan 28	Tyuratam	SL-4	6,000	89.4	223	270	70.0	Photo recon. Recovered 2/11
STS 51-L		US	Jan 28	KSC	Challenger	23,695*					Vehicle destroyed by explosion 73 seconds after launch. Astronauts Dick Scobee, Michael Smith, Ronald McNair, Ellison Onizuka, Greg Jarvis, Christa McAuliffe, Judith Resnik perished. Failure traced to O-ring seal
PRC 18	1986 010A	PRC	Feb 1	Xi Chang	CZ-3		1,435.9	35,779	35,790	0.2	Domestic communications. Stationed above 103 deg. e long.
Kosmos 1729	1986 011A	USSR	Feb 1	Plesetsk	SL-6	1,250	718.0	938	39,389	62.8	Early warning; Replaced Kosmos 1569
Kosmos 1730	1986 012A	USSR	Feb 4	Plesetsk	SL-4	6,000	89.6	224	280	72.9	Military photo recon. Recovered 2/13

*Payload weight

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1731	1986 013A	USSR	Feb 7	Tyuratam	SL-4	2,500	89.9	183	269	64.8	Military photo recon. Reentered 10/3
USA 15-18	1986 014A	US	Feb 9	WSMC	Atlas H		Elements not available				In orbit
Kosmos 1732	1986 015A	USSR	Feb 11	Plesetsk	SL-14		116.0	1,477	1,524	73.6	Geodetic
BS-2B	1986 016A	Japan	Feb 12	Tanegashima	N-II	677	1,436.2	35,774	35,802	0.0	Domestic communications. Placed above 117 deg. e long.
Mir	1986 017A	USSR	Feb 19	Tyuratam	SL-13	20,100	91.5	335	358	51.6	Soviet space station; occupied by Leonid Kizim, Vladimir Solovyov, 3/15-5/6 and 6/27-7/16
Kosmos 1733	1966 018A	USSR	Feb 19	Plesetsk	SL-14		97.7	632	663	82.5	Elint. Replaced Kosmos 1544
SPOT 1	1986 019A	France	Feb 22	Kourou	Ariane 1	1,830	101.4	824	828	98.7	Remote sensing for earth resources, commercial use. Booster exploded in orbit, 400 pieces
Viking	1986 019B	Sweden	Feb 22	Kourou	Ariane 1	538	261.7	790	13,359	98.8	Studying magnetic, electric, ultraviolet properties of auroral regions
Kosmos 1734	1986 020A	USSR	Feb 26	Plesetsk	SL-4	6,000	89.1	163	348	67.1	Military photo recon. Reentered 4/26
Kosmos 1735	1986 021A	USSR	Feb 27	Tyuratam	SL-11		93.2	419	442	65.0	Ocean surveillance. Decayed 11/17/88
Soyuz T-15	1986 022A	USSR	Mar 13	Tyuratam	SL-4	7,000	91.2	352	339	51.6	Cosmonauts Leonid Kizim, Vladimir Solovyov aboard. Docked with Mir 3/15. Returned 7/16 after 125 days, 1 mn.
Progress 25	1986 023A	USSR	Mar 19	Tyuratam	SL-4	7,000	91.2	332	359	51.6	Resupplied Mir. Docked 3/21; undocked 4/20; reentered 4/21
Kosmos 1736	1986 024A	USSR	Mar 21	Tyuratam	SL-11	5,000	104.4	940	993	65.0	Ocean surveillance; storage orbit
Kosmos 1737	1986 025A	USSR	Mar 25	Tyuratam	SL-11		91.0	213	436	73.3	Ocean surveillance. Reentered 12/3
GSTAR 2	1986 026A	US	Mar 28	Kourou	Ariane 3	1,243	1,436.2	35,775	35,800	0.1	U.S. commercial communications. Stationed above 105 deg. w long.
Brasilsat 2	1986 026B	Brazil	Mar 28	Kourou	Ariane 3	1,140	1,436.2	35,781	35,796	0.0	Brazilian domestic communications. Located above 70 deg. w long.
Kosmos 1738	1986 027A	USSR	Apr 4	Tyuratam	SL-12	2,000	1,436.2	35,740	35,834	0.8	Communications. Placed above 346 deg. e long.
Kosmos 1739	1986 028A	USSR	Apr 9	Tyuratam	SL-4	6,000	89.5	173	329	64.8	Military photo recon. Reentered 6/7

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Kosmos 1740	1986 029A	USSR	Apr 15	Plesetsk	SL-4	6,000	92.2	352	413	72.9	Military photo recon. Recovered 4/28
Kosmos 1741	1986 030A	USSR	Apr 18	Plesetsk	SL-8	700	100.7	779	808	74.0	Store/dump communications; replaced Kosmos 1503
Molniya 3-28	1986 031A	USSR	Apr 18	Plesetsk	SL-6	1,800	717.7	512	39,841	64.2	Communications; replaced Molniya 3-23
None		US	Apr 18	WSMC	Titan 34D						Destroyed by launch vehicle explosion 16 seconds after launch
Progress 26	1986 032A	USSR	Apr 23	Tyuratam	SL-4	7,000	91.3	336	344	51.6	Resupplied Mir; Docked with Mir, 4/26. Undocked 6/22; reentered 6/23
GOES G		US	May 3	ESMC	Delta						Destroyed by range safety after losing power seconds after launch
Kosmos 1742	1986 033A	USSR	May 14	Plesetsk	SL-4	6,000	92.2	351	416	72.9	Military photo recon. Recovered 5/28
Kosmos 1743	1986 034A	USSR	May 15	Plesetsk	SL-14	1,600	97.6	629	661	82.6	Elint. Replaced Kosmos 1626
Soyuz TM	1986 035A	USSR	May 21	Tyuratam	SL-4	7,000	91.2	331	372	51.6	Test mission of new vehicle design. Docked with Mir, 5/23.Undocked, 5/29; returned, 5/30
Kosmos 1744	1986 036A	USSR	May 21	Plesetsk	SL-4	6,000	90.4	218	371	62.8	Materials processing exps. Recovered 6/4
Kosmos 1745	1986 037A	USSR	May 23	Plesetsk	SL-8	810	104.9	966	1,011	82.9	Navigation; replaced Kosmos 1627
Ekran 15	1986 038A	USSR	May 24	Tyuratam	SL-12	2,000	1,436.3	35,788	35,794	0.4	Domestic communications; placed above 99 deg. e long.
Meteor 2-14	1986 039A	USSR	May 27	Plesetsk	SL-14	2,000	104.1	941	960	82.5	Meteorological
Kosmos 1746	1986 040A	USSR	May 28	Plesetsk	SL-4	6,000	89.8	255	269	82.3	Earth resources photo recon. Recovered 6/12
Kosmos 1747	1986 041A	USSR	May 29	Tyuratam	SL-4	600	89.1	248	252	70.4	Military photo recon. Recovered 6/12
INTELSAT VA		ESA	May 30	Kourou	Ariane 2						Destroyed by range safety when 3rd stage failed to ignite
Kosmos 1748	1986 042A	USSR	Jun 6	Plesetsk	SL-8	40	115.1	1,452	1,467	74.0	Tactical communications; 8-satellite launch. Failed 9/1
Kosmos 1749	1986 042B	USSR	Jun 6	Plesetsk	SL-8	40	114.4	1,392	1,467	74.0	Tactical communications
Kosmos 1750	1986 042C	USSR	Jun 6	Plesetsk	SL-8	40	114.6	1,406	1,468	74.0	Tactical communications
Kosmos 1751	1986 042D	USSR	Jun 6	Plesetsk	SL-8	40	115.6	1,465	1,503	74.0	Tactical communications. Failed 9/1
Kosmos 1752	1986 042E	USSR	Jun 6	Plesetsk	SL-8	40	115.4	1,466	1,485	74.0	Tactical communications

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1753	1986 042F	USSR	Jun 6	Plesetsk	SL-8	40	115.3	1,460	1,475	74.0	Tactical communications
Kosmos 1754	1986 042G	USSR	Jun 6	Plesetsk	SL-8	40	114.9	1,436	1,468	74.0	Tactical communications
Kosmos 1755	1986 042H	USSR	Jun 6	Plesetsk	SL-8	40	114.8	1,423	1,467	74.0	Tactical communications. Failed 8/1
Kosmos 1756	1985 043A	USSR	Jun 6	Tyuratam	SL-4	6,000	89.4	169	323	64.9	Military photo recon. Reentered 8/4
Gorizont 12	1986 044A	USSR	Jun 10	Tyuratam	SL-12	2,000	1,436.1	35,759	35,814	0.8	Domestic communications; stationed above 345 deg. e long.
Kosmos 1757	1986 045A	USSR	Jun 11	Plesetsk	SL-4	6,000	90.0	165	384	82.3	Earth resources photo recon. Recovered 6/25
Kosmos 1758	1986 046A	USSR	Jun 12	Plesetsk	SL-14	1,600	97.7	628	666	82.5	Elint. Replaced Kosmos 1666
Kosmos 1759	1986 047A	USSR	Jun 18	Plesetsk	SL-8	810	104.8	967	1,000	82.9	Navigation; replaced Kosmos 1634
Kosmos 1760	1986 048A	USSR	Jun 19	Tyuratam	SL-4	6,000	92.2	350	415	70.0	Military photo recon. Recovered 7/3
Molniya 3-29	1986 049A	USSR	Jun 19	Plesetsk	SL-6	1,800	717.7	600	39,750	63.9	Communications; replaced Molniya 3-20
Kosmos 1761	1986 050A	USSR	Jul 5	Plesetsk	SL-6	1,800	717.2	1,393	38,934	62.8	Early warning; maneuvered. Replaced Kosmos 1698
Kosmos 1762	1986 051A	USSR	Jul 10	Plesetsk	SL-4	6,300	89.8	255	269	82.5	Earth resources photo recon. Recovered 7/24
Kosmos 1763	1986 052A	USSR	Jul 16	Plesetsk	SL-8	700	100.4	754	803	74.0	Store/dump communications; replaced Kosmos 1741
Kosmos 1764	1986 053A	USSR	Jul 17	Tyuratam	SL-4	7,000	89.5	170	327	64.9	Photo recon. Reentered 9/11
Kosmos 1765	1986 054A	USSR	Jul 24	Plesetsk	SL-4	6,300	92.2	353	412	72.9	Photo recon. Recovered 8/7
Kosmos 1766	1986 055A	USSR	Jul 28	Plesetsk	SL-14	1,600	97.7	631	662	82.5	Oceanographic
Kosmos 1767	1986 056A	USSR	Jul 30	Tyuratam	SL-16	15,000	88.3	184	193	64.9	Unknown payload, died 8/1. Decayed 8/16
Molniya 1-67	1986 057A	USSR	Jul 30	Plesetsk	SL-6	1,800	717.7	375	39,968	63.0	Communications; replaced Molniya 1-59
Kosmos 1768	1986 058A	USSR	Aug 2	Plesetsk	SL-4	6,000	89.8	255	269	82.6	Earth resources photo recon. Recovered 8/16
Kosmos 1769	1986 059A	USSR	Aug 4	Tyuratam	SL-11	5,000	93.3	429	443	65.0	Ocean surveillance. Exploded 9/21. Decayed 2/18/88
Kosmos 1770	1986 060A	USSR	Aug 6	Tyuratam	SL-4	7,000	89.7	238	281	64.7	Photo recon. Reentered 2/2/87
EGP	1986 061A	Japan	Aug 12	Tanegashima	H-1	685	115.7	1,479	1,497	50.0	Experimental Geophysical Payload. Test of new launch vehicle
JAS-1/Oscar 12	1986 061B	Japan	Aug 12	Tanegashima	H-1	50	116.9	1,480	1,497	50.0	Japanese Amateur Satellite (radio relay)

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1771	1986 062A	USSR	Aug 20	Tyuratam	SL-11	5,000	104.2	910	1,001	65.0	Ocean surveillance; storage orbit
Kosmos 1772	1986 063A	USSR	Aug 21	Plesetsk	SL-4	6,300	89.4	356	415	72.9	Photo recon. Recovered 9/3
Kosmos 1773	1986 064A	USSR	Aug 27	Tyuratam	SL-4	7,000	89.7	173	343	64.9	Photo recon. Reentered 10/21
Kosmos 1774	1986 065A	USSR	Aug 28	Plesetsk	SL-6	1,800	717.5	925	39,428	64.3	Early warning; replaced Kosmos 1547
Kosmos 1775	1986 066A	USSR	Sep 3	Tyuratam	SL-4	6,300	92.1	348	414	70.4	Photo recon. Recovered 9/17
Kosmos 1776	1986 067A	USSR	Sep 3	Plesetsk	SL-8	700	94.5	471	513	74.0	Minor military. Decayed 12/15/89
Molniya 1-68	1986 068A	USSR	Sep 5	Plesetsk	SL-6	1,800	717.7	602	39,747	63.1	Communications; replaced Molniya 1-57
USA 19	1986 069A	US	Sep 5	ESMC	Delta		93.9	212	719	39.1	Delta 180. SDI test. Decayed 9/28
None	1986 069B	US	Sep 5	ESMC	Delta		92.9	223	611	22.8	ASAT target. Decayed 11/25
Kosmos 1777	1986 070A	USSR	Sep 10	Plesetsk	SL-8	700	100.7	774	809	74.0	Communications; replaced Kosmos 1624
Kosmos 1778	1986 071A	USSR	Sep 16	Tyuratam	SL-12		675.7	19,131	19,139	64.8	Navigation; Glonass system
Kosmos 1779	1986 071B	USSR	Sep 16	Tyuratam	SL-12		675.7	19,123	19,138	64.8	Navigation; Glonass system
Kosmos 1780	1986 071C	USSR	Sep 16	Tyuratam	SL-12		675.7	19,105	19,153	64.8	Navigation; Glonass system
Kosmos 1781	1986 072A	USSR	Sep 17	Tyuratam	SL-4	6,000	92.2	345	416	70.4	Photo recon. Recovered 10/1
NOAA 10	1986 073A	US	Sep 17	WSMC	Atlas E	1,700	101.2	808	826	98.7	Meteorological
Kosmos 1782	1986 074A	USSR	Sep 30	Plesetsk	SL-14	1,400	97.7	636	664	82.5	Elint
Kosmos 1783	1986 075A	USSR	Oct 3	Plesetsk	SL-6	1,800	358.1	639	20,009	62.8	Launch vehicle malfunction, failed to achieve operable orbit
PRC 19	1986 076A	PRC	Oct 6	Shuang Chen Tzug	CZ-2	2,500	90.0	172	375	56.9	Earth resources, film capsule recovered 10/11
Kosmos 1784	1986 077A	USSR	Oct 6	Tyuratam	SL-4	7,000	89.2	207	265	64.8	Photo recon. Reentered 11/11
Kosmos 1785	1986 078A	USSR	Oct 15	Plesetsk	SL-6	1,800	717.6	1,011	39,325	64.4	Early warning; replaced Kosmos 1596
Molniya 3-30	1986 079A	USSR	Oct 20	Plesetsk	SL-6	1,800	717.8	402	39,944	62.8	Communications; replaced Molniya 3-21
Kosmos 1786	1986 080A	USSR	Oct 22	Tyuratam	SL-16	15,000	96.7	149	1,054	64.8	Decayed 3/6/88. Unknown payload
Kosmos 1787	1986 081A	USSR	Oct 22	Tyuratam	SL-4	6,300	89.6	230	281	70.0	Photo recon. Recovered 11/4

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Raduga 19	1986 082A	USSR	Oct 25	Tyuratam	SL-12	2,000	1,436.5	36,765	36,822	1.1	Communications. Placed above 45 deg. e long. Moved to 36 deg. e, 8/91
Kosmos 1788	1986 083A	USSR	Oct 27	Plesetsk	SL-8	700	94.4	460	514	65.8	Minor military. Decayed 1/21/91
Kosmos 1789	1986 084A	USSR	Oct 31	Plesetsk	SL-4	6,300	91.1	318	338	82.6	Earth resources photo recon. Recovered 11/14
Kosmos 1790	1986 085A	USSR	Nov 4	Plesetsk	SL-4	6,300	89.5	224	279	72.9	Photo recon. Recovered 11/18
Kosmos 1791	1986 086A	USSR	Nov 13	Plesetsk	SL-8	810	104.7	951	1,010	82.9	Navigation; replaced Kosmos 1553
Kosmos 1792	1986 087A	USSR	Nov 13	Tyuratam	SL-4	7,000	89.3	167	312	64.9	Photo recon. Reentered 1/5/87
Polar Bear	1986 088A	US	Nov 14	WSMC	Scout	125	104.9	960	1,015	89.6	Polar Beacon Experiments and Research satellite
Molniya 1-69	1986 089A	USSR	Nov 15	Plesetsk	SL-6	1,800	717.8	957	39,397	63.0	Communications; replaced Molniya 1-60
Gorizont 13	1986 090A	USSR	Nov 18	Tyuratam	SL-12	2,000	1,436.2	35,777	35,801	0.4	Communications; located above 90 deg. e long.
Kosmos 1793	1986 091A	USSR	Nov 20	Plesetsk	SL-6	1,800	717.7	1,316	39,035	62.8	Early warning; replaced Kosmos 1687
Kosmos 1794	1986 092A	USSR	Nov 21	Plesetsk	SL-8	40	115.6	1,467	1,501	74.0	Tactical communications. 8 satellite launch
Kosmos 1795	1986 092B	USSR	Nov 21	Plesetsk	SL-8	40	115.4	1,467	1,482	74.0	Tactical communications
Kosmos 1796	1986 092C	USSR	Nov 21	Plesetsk	SL-8	40	115.2	1,455	1,479	74.0	Tactical communications
Kosmos 1797	1986 092D	USSR	Nov 21	Plesetsk	SL-8	40	115.0	1,445	1,472	74.0	Tactical communicaitons
Kosmos 1798	1986 092E	USSR	Nov 21	Plesetsk	SL-8	40	114.9	1,429	1,473	74.0	Tactical communications
Kosmos 1799	1986 092F	USSR	Nov 21	Plesetsk	SL-8	40	114.7	1,415	1,472	74.0	Tactical communications
Kosmos 1800	1986 092G	USSR	Nov 21	Plesetsk	SL-8	40	114.5	1,399	1,473	74.0	Tactical communications
Kosmos 1801	1986 092H	USSR	Nov 21	Plesetsk	SL-8	40	114.4	1,386	1,471	74.0	Tactical communications
Kosmos 1802	1986 093A	USSR	Nov 24	Plesetsk	SL-8	810	104.9	963	1,025	82.9	Navigation; replaced Kosmos 1605
Kosmos 1803	1986 094A	USSR	Dec 2	Plesetsk	SL-14	700	115.9	1,495	1,499	82.6	Geodetic
Kosmos 1804	1986 095A	USSR	Dec 4	Tyuratam	SL-4	6,300	92.1	345	412	70.0	Photo recon. Recovered 12/18
FltSatCom 7	1986 096A	US	Dec 5	ESMC	Atlas Centaur	2,310	1,436.1	35,703	35,875	4.3	Military communications
Kosmos 1805	1986 097A	USSR	Dec 10	Plesetsk	SL-14	1,400	97.7	635	661	82.5	Elint? May be new spacecraft
Kosmos 1806	1986 098A	USSR	Dec 12	Plesetsk	SL-6	1,800	717.9	832	39,528	62.8	Early warning; replaced Kosmos 1729

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1807	1986 099A	USSR	Dec 16	Plesetsk	SL-4	6,700	89.5	164	336	67.1	Photo recon. Reentered 1/23/87
Kosmos 1808	1986 100A	USSR	Dec 17	Plesetsk	SL-8	810	105.0	973	1,020	82.9	Navigation; replaced Kosmos 1704/1598
Kosmos 1809	1986 101A	USSR	Dec 18	Plesetsk	SL-14	700	104.1	944	964	82.5	Science mission
Kosmos 1810	1986 102A	USSR	Dec 26	Tyuratam	SL-4	7,000	89.6	245	263	64.8	Photo recon. Decayed 9/11/87
Molniya 1-70	1986 103A	USSR	Dec 26	Plesetsk	SL-6	1,800	717.8	1,043	39,310	62.9	Communications; replaced Molniya 1-62
Meteor 2-15	1987 001A	USSR	Jan 5	Plesetsk	SL-14	2,000	104.0	939	957	82.5	Meteorological
Kosmos 1811	1987 002A	USSR	Jan 9	Tyuratam	SL-4	7,000	89.4	200	286	64.6	Photo recon. Reentered 2/13
Kosmos 1812	1987 003A	USSR	Jan 14	Plesetsk	SL-14	1,600	97.7	634	664	82.5	Ocean surveillance
Kosmos 1813	1987 004A	USSR	Jan 15	Plesetsk	SL-4	6,300	92.2	353	413	72.8	Military photo recon. Reentry module destroyed by explosion 1/29. 200 trackable fragments. Decayed 3/18/89
Progress 27	1987 005A	USSR	Jan 16	Tyuratam	SL-4	7,000	91.1	315	344	51.6	Supplied Mir. Raised station's orbit; prepared for Soyuz TM-2 arrival. Docked 1/18; undocked 2/23; reentered 2/25
Kosmos 1814	1987 006A	USSR	Jan 21	Plesetsk	SL-8	700	100.7	771	810	74.1	Store/dump communications
Kosmos 1815	1987 007A	USSR	Jan 22	Kapustin Yar	SL-8	700	93.5	345	550	50.7	Minor military. Decayed 11/15/88
Molniya 3-31	1987 008A	USSr	Jan 22	Plesetsk	SL-6	1,800	735.9	457	39,897	62.8	Domestic communications; on station 2/19
Kosmos 1816	1987 009A	USSR	Jan 29	Plesetsk	SL-8	810	104.8	961	1,008	82.9	Navigation
Kosmos 1817	1987 010A	USSR	Jan 30	Tyuratam	SL-12	2,000	87.4	188	210	51.6	Communications. Booster malfunction. Payload decayed 1/31
Kosmos 1818	1987 011A	USSR	Feb 1	Plesetsk	SL-11		110.7	786	800	65.0	Ocean surveillance
Astro C	1987 012A	Japan	Feb 5	Kagoshima	Mu-3S	420	97.0	517	708	31.1	Science. Studied X-rays, gamma rays. Decayed 11/1/91
Soyuz TM-2	1987 013A	USSR	Feb 5	Tyuratam	SL-4	7,000	91.6	517	708	51.6	Transported Yuri Romanenko, Aleksander Laveykin to Mir. Docked 2/7. Undocked 7/29. Returned with Laveykin, Alexander Viktorenko, Mohammid Faris (TM-3 crew), 7/30. Flight time: 174 days, 3 hr, 26 mn.

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1819	1987 014A	USSR	Feb 7	Plesetsk	SL-4	6,700	89.1	209	256	72.8	Military photo recon. Recovered 2/18
USA 21	1987 015A	US	Feb 11	WSMC	Titan IIIB		Elements not available				In orbit
Kosmos 1820	1987 016A	USSR	Feb 14	Tyuratam	SL-16	15,000	88.7	174	240	64.8	Launch vehicle test. Decayed 3/6
Kosmos 1821	1987 017A	USSR	Feb 18	Plesetsk	SL-8	810	104.9	963	1,017	82.9	Navigation
MOS-1	1987 018A	Japan	Feb 18	Tanegashima	N-II	745	103.2	909	909	99.1	Remote ocean sensing
Kosmos 1822	1987 019A	USSR	Feb 19	Plesetsk	SL-4	12,000	89.5	225	287	73.0	Photo recon. Recovered 3/5
Kosmos 1823	1987 020A	USSR	Feb 20	Plesetsk	SL-14	700	116.0	1,497	1,538	73.6	Geodetic. Broke up 12/17
Kosmos 1824	1987 021A	USSR	Feb 26	Plesetsk	SL-4	700	89.5	163	337	67.1	Photo recon. Reentered 4/22
GOES 7	1987 022A	US	Feb 26	ESMC	Delta	399	1,436.3	35,783	37,796	0.1	Meteorological. Located above 83 deg. w long.
Progress 28	1987 023A	USSR	Mar 3	Tyuratam	SL-4	7,000	89.2	198	274	51.6	Resupplied Mir. Docked 3/5; undocked 3/26; reentered 3/28
Kosmos 1825	1987 024A	USSR	Mar 3	Plesetsk	SL-14	1,600	97.7	633	664	82.5	Ocean surveillance
Kosmos 1826	1987 025A	USSR	Mar 11	Plesetsk	SL-4	6,300	92.3	355	415	72.9	Photo recon. Recovered 3/24
Kosmos 1827	1987 026A	USSR	Mar 13	Plesetsk	SL-14		113.8	1,393	1,409	82.6	Six satellite launch. In orbit
Kosmos 1828	1987 026B	USSR	Mar 13	Plesetsk	SL-14		113.7	1,382	1,409	82.6	In orbit
Kosmos 1829	1987 026C	USSR	Mar 13	Plesetsk	SL-14		114.0	1,408	1.412	82.6	In orbit
Kosmos 1830	1987 026D	USSR	Mar 13	Plesetsk	SL-14		113.9	1,405	1,409	82.6	In orbit
Kosmos 1831	1987 026E	USSR	Mar 13	Plesetsk	SL-14		113.8	1,388	1,409	82.6	In orbit
Kosmos 1832	1987 026F	USSR	Mar 13	Plesetsk	SL-14		113.9	1,398	1,409	82.6	In orbit
Kosmos 1833	1987 027A	USSR	Mar 18	Tyuratam	SL-16	1,600	101.9	848	853	71.0	Test payload. Died 2/18
Raduga 20	1987 028A	USSR	Mar 19	Tyuratam	SL-12	2,000	1,436.1	35,766	35,827	0.8	Domestic communications. Located above 85 deg. e long.
Palapa B2P	1987 029A	Indnsa	Mar 20	ESMC	Delta	652	1,436.2	35,788	35,788	0.0	Communications. Located above 113 deg. w long.
Rohini		India	Mar 24	Sriharikota	SLV	150					Failed due to 2nd stage malfunction
FltSatCom 6		US	Mar 26	ESMC	Atlas-Centaur	2,300					Destroyed by range safety when it veered out of control

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
KVANT	1987 030A	USSR	Mar 31	Tyuratam	SL-13	20,000	91.5	336	357	51.6	High energy observatory. Attempted 4/5 Mir docking failed, retried 4/9. Crew EVA cleared docking unit obstruction, 4/11.
Service Module	1987 030C	USSR	Mar 31	Tyuratam	SL-13		92.2	366	390	51.6	Kvant service module undocked 4/12, boosted
Kosmos 1834	1987 031A	USSR	Apr 8	Tyuratam	SL-11	5,000	92.8	402	415	65.0	Elint. Decayed 10/14/88
Kosmos 1835	1987 032A	USSR	Apr 9	Tyuratam	SL-4	7,000	89.3	165	314	64.8	Military photo recon. Recovered 6/4
Kosmos 1836	1987 033A	USSR	Apr 16	Tyuratam	SL-4	7,000	89.8	236	287	64.8	Military photo recon. Recovered 12/2
Progress 29	1987 034A	USSR	Apr 21	Tyuratam	SL-4	7,000	90.3	221	361	51.6	Resupplied Mir. Docked 4/23; undocked and reentered 5/11
Kosmos 1837	1987 035A	USSR	Apr 22	Plesetsk	SL-4	12,000	88.5	174	227	82.3	Photo recon. Recovered 4/28
Kosmos 1838	1987 036A	USSR	Apr 24	Tyuratam	SL-12	1,400	303.1	201	16,934	64.9	Glonass series. Left in unusable orbit by upper stage failure. Decayed 5/15/91
Kosmos 1839	1987 036B	USSR	Apr 24	Tyuratam	SL-12	1,400	303.1	202	16,932	64.9	Glonass. Upper stage failure. Decayed 5/8/91
Kosmos 1840	1987 036C	USSR	Apr 24	Tyuratam	SL-12	1,400	303.2	213	17,124	64.9	Glonass. Upper stage failure. Decayed 9/14/91
Kosmos 1841	1987 037A	USSR	Apr 24	Plesetsk	SL-4	6,300	90.4	215	376	62.8	Materials processing. Recovered 5/8
Kosmos 1842	1987 038A	USSR	Apr 27	Plesetsk	SL-14	1,600	97.7	631	663	82.5	Elint
Kosmos 1843	1987 039A	USSR	May 5	Tyuratam	SL-4	6 ton	92.2	347	415	70.4	Recovered 5/19
Gorizont 14	1987 040A	USSR	May 11	Tyuratam	SL-13	2,000	1,401.5	35,032	35,182	0.5	Domestic communications
Kosmos 1844	1987 041A	USSR	May 13	Tyuratam	SL-16		101.9	846	851	71.0	Elint
Kosmos 1845	1987 042A	USSR	May 13	Plesetsk	SL-4	6,700	92.2	348	415	70.4	Photo recon. Recovered 5/27
Energiya	None	USSR	May 15	Tyuratam	SL-17	100,000	—	—	—	—	1st flight of Soviet superbooster
USA 22-25	1987 043A	US	May 15	WSMC	Atlas H		Elements not available				In orbit
Progress 30	1987 044A	USSR	May 19	Tyuratam	SL-4	700	90.9	288	344	51.6	Resupplied Mir. Docked 5/21; undocked, reentered 7/19
Kosmos 1846	1987 045A	USSR	May 21	Plesetsk	SL-4	6,300	91.9	319	339	82.3	Photo recon. Recovered 6/4
Kosmos 1847	1987 046A	USSR	May 26	Plesetsk	SL-4	7,000	88.5	159	318	67.2	Photo recon. Reentered 7/22

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1848	1987 047A	USSR	May 28	Plesetsk	SL-4	6,300	92.2	354	411	72.9	Photo recon. Recovered 6/11
Kosmos 1849	1987 048A	USSR	Jun 4	Plesetsk	SL-6	1,800	717.9	853	39,506	63.3	Early warning
Kosmos 1850	1987 049A	USSR	Jun 9	Plesetsk	SL-8	700	100.7	781	804	74.0	Store/dump communications. Died 1/21/88
Kosmos 1851	1987 050A	USSR	Jun 12	Plesetsk	SL-6	1,800	717.2	599	39,729	62.9	Early warning
Kosmos 1852	1987 051A	USSR	Jun 16	Plesetsk	SL-8	40	115.7	1,473	1,501	74.0	Eight satellite launch. Tactical communications
Kosmos 1853	1987 051B	USSR	Jun 16	Plesetsk	SL-8	40	115.5	1,472	1,484	74.0	Tactical communications
Kosmos 1854	1987 051C	USSR	Jun 16	Plesetsk	SL-8	40	115.3	1,459	1,482	74.0	Tactical communications
Kosmos 1855	1987 051D	USSR	Jun 16	Plesetsk	SL-8	40	115.2	1,447	1,478	74.0	Tactical communications
Kosmos 1856	1987 051E	USSR	Jun 16	Plesetsk	SL-8	40	115.0	1,432	1,477	74.0	Tactical communications
Kosmos 1857	1987 051F	USSR	Jun 16	Plesetsk	SL-8	40	114.8	1,418	1,478	74.0	Tactical communications
Kosmos 1858	1987 051G	USSR	Jun 16	Plesetsk	SL-8	40	114.7	1,403	1,478	74.0	Tactical communications
Kosmos 1859	1987 051H	USSR	Jun 16	Plesetsk	SL-8	40	114.5	1,388	1,477	74.0	Tactical communications
Kosmos 1860	1987 052A	USSR	Jun 18	Tyuratam	SL-11	5,000	104.0	902	992	65.0	Ocean recon. Split up 7/20, nuclear power source boosted to high orbit, 7/28
DMSP 8	1987 053A	US	Jun 20	WSMC	Atlas E	750	Elements not available				Weather imaging
Kosmos 1861	1987 054A	USSR	Jun 23	Plesetsk	SL-8	810	104.9	982	997	82.9	Navigation
Kosmos 1862	1987 055A	USSR	Jul 1	Plesetsk	SL-14	1,600	97.7	627	665	82.5	Elint
Kosmos 1863	1987 056A	USSR	Jul 4	Plesetsk	SL-4	6,300	92.3	357	416	72.9	Photo recon. Recovered 7/18
Kosmos 1864	1987 057A	USSR	Jul 6	Plesetsk	SL-8	810	104.8	961	1,006	82.9	Navigation
Kosmos 1865	1987 058A	USSR	Jul 8	Tyuratam	SL-4	7,000	89.6	205	307	64.8	Photo recon. Recovered 8/14
Kosmos 1866	1987 059A	USSR	Jul 9	Plesetsk	SL-4	7,000	89.7	175	345	67.2	Photo recon. Engine failed to shut down, propellent depleted prematurely. Exploded 7/26. Decayed 11/6
Kosmos 1867	1987 060A	USSR	Jul 10	Tyuratam	SL-11	5,000	100.8	791	798	65.0	Ocean recon.
Kosmos 1868	1987 061A	USSR	Jul 14	Plesetsk	SL-8	700	94.5	279	669	74.0	Minor military. Decayed 3/3/89
Kosmos 1869	1987 062A	USSR	Jul 16	Plesetsk	SL-14	1,600	97.7	631	663	82.5	Ocean sensing

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Soyuz TM-3	1987 063A	USSR	Jul 22	Tyuratam	SL-4	7,000	89.8	231	297	51.6	Transported Alexander Viktorenko, Alexander Alexandrov, Mohammed Faris to Mir. Docked 7/24. Returned with Yuri Romanenko (TM-2), Alexander Alexandrov, Anatolyi Levchenko (TM-4), 12/29. Flight time: 160 days, 7 hrs, 17 mn.
Kosmos 1870	1987 064A	USSR	Jul 22	Tyuratam	SL-13	20,000	89.5	245	259	71.9	Remote sensing. Possible modified Salyut. Decayed 7/29/89
Kosmos 1871	1987 065A	USSR	Aug 1	Tyuratam	SL-16	15,000	88.1	168	188	97.0	Unknown payload; decayed 8/10
Progress 31	1987 066A	USSR	Aug 3	Tyuratam	SL-4	7,000	88.9	187	250	51.6	Resupplied Mir. Docked 8/5; Undocked 9/21; Reentered 9/23
PRC 20	1987 067A	PRC	Aug 5	Shuang Cheng Tzu	CZ-2	2,500	90.2	171	395	63.0	Micro-gravity experiments. Capsule recovered 8/10, spacecraft reentered 8/23
Meteor 2-16	1987 068A	USSR	Aug 18	Plesetsk	SL-14	200	104.0	940	957	82.6	Meteorological
Kosmos 1872	1987 069A	USSR	Aug 19	Plesetsk	SL-4	6,700	90.8	247	385	72.9	Photo recon. Recovered 8/30
ETS-5	1987 070A	Japan	Aug 27	Tanegashima	H-1	550	1,436.1	35,763	35,811	0.0	Communications. Located above 150 deg. e long.
Kosmos 1873	1987 071A	USSR	Aug 28	Tyuratam	SL-16	15,000	88.7	175	241	64.8	Unknown payload. Decayed 9/14
Kosmos 1874	1987 072A	USSR	Sep 3	Plesetsk	SL-4	6,700	89.6	223	284	72.9	Photo recon. Recovered 9/17
Ekran 16	1987 073A	USSR	Sep 4	Tyuratam	SL-12	2,000	1,436.0	35,765	35,804	0.1	Domestic communications. Located above 99 deg. e long.
Kosmos 1875	1987 074A	USSR	Sep 7	Plesetsk	SL-14	40	113.7	1,407	1,383	82.6	Six satellite launch. In orbit
Kosmos 1876	1987 074B	USSR	Sep 7	Plesetsk	SL-14	40	114.0	1,412	1,407	82.6	In orbit
Kosmos 1877	1987 074C	USSR	Sep 7	Plesetsk	SL-14	40	113.9	1,408	1,406	82.6	In orbit
Kosmos 1878	1987 074D	USSR	Sep 7	Plesetsk	SL-14	40	113.9	1,408	1,399	82.6	In orbit
Kosmos 1879	1987 074E	USSR	Sep 7	Plesetsk	SL-14	40	113.8	1,408	1,394	82.6	In orbit
Kosmos 1880	1987 074F	USSR	Sep 7	Plesetsk	SL-14	40	113.8	1,408	1,390	82.6	In orbit
PRC 21	1987 075A	PRC	Sep 9	Shuang Cheng Tzu	CZ-2	2,500	89.6	308	204	63.0	Remote sensing. Return capsule recovered 9/17; vehicle reentered 10/4

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Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1881	1987 076A	USSR	Sep 11	Tyuratam	SL-4	7,000	89.5	227	270	64.8	Photo recon. Reentered 3/30/88
Kosmos 1882	1987 077A	USSR	Sep 15	Plesetsk	SL-4	6,700	88.5	179	222	82.3	Photo recon, earth resources. Recovered 10/6
Aussat K3	1987 078A	Aust	Sep 16	Kourou	Ariane 3	1,195	1,436.1	35,781	35,793	0.0	Australian domestic communications. Located above 164 deg. e long.
ECS 4	1987 078B	ESA	Sep 16	Kourou	Ariane 3	1,175	1,436.1	35,777	35,797	0.1	European communications. Located above 10 deg. e long.
Kosmos 1883	1987 079A	USSR	Sep 16	Tyuratam	SL-12		675.5	19,109	19,138	64.8	Glonass system. Navigation
Kosmos 1884	1987 079B	USSR	Sep 16	Tyuratam	SL-12		675.5	19,113	19,136	65.0	Glonass system. Navigation
Kosmos 1885	1987 079C	USSR	Sep 16	Tyuratam	SL-12		675.4	19,112	19,134	64.9	Glonass system. Navigation
Oscar 27	1987 080A	US	Sep 16	WSMC	Scout	59	107.3	1,018	1,183	90.3	In orbit
Oscar 29	1987 080B	US	Sep 16	WSMC	Scout	59	107.3	1,017	1,185	90.3	In orbit
Kosmos 1886	1987 081A	USSR	Sep 17	Plesetsk	SL-4	6,700	89.4	160	327	67.1	Photo recon. Recovered 11/2
Progress 32	1987 082A	USSR	Sep 23	Tyuratam	SL-4	7,000	91.0	295	355	51.6	Resupplied Mir/Kvant. Docked 9/26; undocked 11/10 for control tests and redocked 1.5 hrs later. Undocked 11/17; Reentered 11/19
Kosmos 1887	1987 083A	USSR	Sep 29	Plesetsk	SL-4	6,700	90.5	214	382	62.8	Biosat with 2 monkeys aboard. Recovered 10/12
Kosmos 1888	1987 084A	USSR	Oct 1	Tyuratam	SL-12	2,000	1,436.2	35,759	35,817	1.2	Communications test. Located above 80 deg. e long.
Kosmos 1889	1987 085A	USSR	Oct 9	Tyuratam	SL-4	6,700	92.1	346	412	70.0	Photo recon. Recovered 10/23
Kosmos 1890	1987 086A	USSR	Oct 10	Tyuratam	SL-11	5,000	92.7	402	415	65.0	Ocean surveillance. Decayed 12/26/88
Kosmos 1891	1987 087A	USSR	Oct 14	Plesetsk	SL-8	810	104.9	953	1,025	82.9	Navigation
Kosmos 1892	1987 088A	USSR	Oct 20	Plesetsk	SL-14	1,600	97.7	635	665	82.5	Elint
Kosmos 1893	1987 089A	USSR	Oct 22	Plesetsk	SL-4	6,700	89.6	166	341	67.2	Photo recon. Recovered 12/16
USA 27	1987 090A	US	Oct 26	WSMC	Titan 34D			elements not available			In orbit
Kosmos 1894	1987 091A	USSR	Oct 28	Tyuratam	SL-12	2,000	1,436.1	35,779	35,793	1.3	Data relay. Stationed above 335 deg. e long.
Kosmos 1895	1987 092A	USSR	Nov 11	Tyuratam	SL-4	6,300	89.6	224	283	70.4	Photo recon. Recovered 11/26
Kosmos 1896	1987 093A	USSR	Nov 14	Tyuratam	SL-4	6,700	89.2	206	263	64.8	Photo recon. Recovered 12/25

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Progress 33	1987 094A	USSR	Nov 20	Tyuratam	SL-4	7,020	91.2	326	343	51.6	Resupplied Mir. Docked 11/23; undocked, reentered 12/19
TVSat 1	1987 095A	FRG	Nov 21	Kourou	Ariane 2	2,077	1,422.8	35,217	35,832	0.1	West German communications. Solar panel failed to deploy. Commercially unusable
Kosmos 1897	1987 096A	USSR	Nov 26	Tyuratam	SL-12	2,000	1,433.1	35,715	35,818	1.4	Communications, data relay. Stationed above 95 deg. e long
USA 28	1987 097A	US	Nov 29	ESMC	Titan 34D			Elements not available			In orbit
Kosmos 1898	1987 098A	USSR	Dec 1	Plesetsk	SL-8	750	100.8	778	810	74.0	Communications
Kosmos 1899	1987 099A	USSR	Dec 7	Tyuratam	SL-4	6,300	89.6	226	279	70.4	Photo recon. Recovered 12/21
Raduga 21	1987 100A	USSR	Dec 10	Tyuratam	SL-12	2,000	1435.9	35,772	35,793	1.4	Domestic communications. Stationed above 128 deg. e long. Moved to 190 e, 4/91
Kosmos 1900	1987 101A	USSR	Dec 12	Tyuratam	SL-11	5,000	89.7	254	268	65.0	Rorsat
Kosmos 1901	1987 102A	USSR	Dec 14	Tyuratam	SL-4	6,700	89.7	172	350	64.9	Photo recon. Recovered 2/3/88
Kosmos 1902	1987 103A	USSR	Dec 15	Plesetsk	SL-8		92.3	368	411	65.8	Minor military. Decayed 12/31/88
Soyuz TM-4	1987 104A	USSR	Dec 21	Tyuratam	SL-4	7,070	91.5	333	358	51.6	Carried Vladimir Titov, Anatoly Levchenko, Musa Manarov to Mir. Docked 12/23. Undocked, redocked at forward port 12/30. Undocked and reentered 6/17/88 with TM-5 crew.
Kosmos 1903	1987 105A	USSR	Dec 21	Plesetsk	SL-6	1,250	717.6	588	39,755	63.0	Early warning
Kosmos 1904	1987 106A	USSR	Dec 23	Plesetsk	SL-8	810	104.9	968	1,008	82.9	Navigation
Kosmos 1905	1987 107A	USSR	Dec 25	Tyuratam	SL-4	6,300	89.6	229	280	70.4	Photo recon. Recovered 1/8/88
Kosmos 1906	1987 108A	USSR	Dec 26	Plesetsk	SL-4	6,300	89.9	257	277	82.6	Photo recon, earth resources. Destroyed 1/31. Reentered 3/13/88
Ekran 17	1987 109A	USSR	Dec 27	Tyuratam	SL-12	2,000	1432.0	35,459	35,953	1.6	Communications; stationed above 99 deg. e long.
Kosmos 1907	1987 110A	USSR	Dec 29	Plesetsk	SL-4	6,300	92.3	356	415	72.8	Photo recon. Recovered 1/12/88
Kosmos 1908	1988 001A	USSR	Jan 6	Plesetsk	SL-14	1,600	97.7	626	660	82.5	Elint

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1909	1988 002A	USSR	Jan 15	Plesetsk	SL-14	100	114.0	1,409	1,410	82.6	Tactical communications
Kosmos 1910	1988 002B	USSR	Jan 15	Plesetsk	SL-14	100	113.9	1,404	1,409	82.6	Tactical communications
Kosmos 1911	1988 002C	USSR	Jan 15	Plesetsk	SL-14	100	113.9	1,397	1,409	82.6	Tactical communications
Kosmos 1912	1988 002D	USSR	Jan 15	Plesetsk	SL-14	100	113.8	1,392	1,409	82.6	Tactical communications
Kosmos 1913	1988 002E	USSR	Jan 15	Plesetsk	SL-14	100	113.8	1,385	1,409	82.6	Tactical communications
Kosmos 1914	1988 002F	USSR	Jan 15	Plesetsk	SL-14	100	113.8	1,382	1,409	82.6	Tactical communications
Progress 34	1988 003A	USSR	Jan 20	Tyuratam	SL-4	7,240	91.4	334	355	51.6	Resupplied Mir. Docked 1/23; undocked and reentered 3/4
Kosmos 1915	1988 004A	USSR	Jan 26	Plesetsk	SL-4	6,300	90.2	195	375	72.9	Military photo recon. Reentered 2/9
Meteor 2-17	1988 005A	USSR	Jan 30	Plesetsk	SL-14	2,000	104.1	933	959	82.6	Meteorological
DMSP 9	1988 006A	US	Feb 3	WSMC	Atlas E	750	101.3	815	826	98.7	Defense Meteorological Satellite Program. Weather imaging
Kosmos 1916	1988 007A	USSR	Feb 3	Tyuratam	SL-4	7,000	89.6	165	339	64.9	Photo recon. Intentionally destroyed 2/27, reentered 2/29
USA 30	1988 008A	US	Feb 8	ESMC	Delta	6,000	90.1	223	333	28.6	Tracking exercise. Subsatellites released. Reentered 3/1
Kosmos 1917-19	1988 009A	USSR	Feb 17	Tyuratam	SL-12		87.8	162	170	64.8	Glonass navigation system. 4th stage failed to separate, destroyed at reentry
Kosmos 1920	1988 010A	USSR	Feb 18	Plesetsk	SL-4	6,300	91.1	318	338	82.6	Photo recon. Reentered 3/9
Kosmos 1921	1988 011A	USSR	Feb 19	Tyuratam	SL-4	6,300	92.1	345	412	70.0	Photo recon. Reentered 3/4
CS-3A (Sakura)	1988 012A	Japan	Feb 19	Tanegashima	H-1	1,100	1,436.2	35,786	35,790	0.0	Domestic communications. Located above 132 deg. e long.
Kosmos 1922	1988 013A	USSR	Feb 26	Plesetsk	SL-6	1,800	717.8	1,021	39,319	62.9	Early warning
STTW-2 (Shiyong Tongbu Tongxin Weixing)	1988 014A	PRC	Mar 7	Xi Chang	CZ-3	900	1,436.2	35,784	35,793	0.0	Domestic communications, carrying 3 China Central TV channels. Registered above 87.5 deg. e long. Actual location 88 deg. e

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1923	1988 015A	USSR	Mar 10	Plesetsk	SL-4	6,300	89.6	227	288	72.8	Photo recon. Reentered 3/22
Kosmos 1924	1988 016A	USSR	Mar 11	Plesetsk	SL-8	40	115.7	1,459	1,513	74.0	Tactical communications. 8-satellite launch
Kosmos 1925	1988 016B	USSR	Mar 11	Plesetsk	SL-8	40	115.5	1,456	1,496	74.0	Communications
Kosmos 1926	1988 016C	USSR	Mar 11	Plesetsk	SL-8	40	115.3	1,457	1,478	74.0	Communications
Kosmos 1927	1988 016D	USSR	Mar 11	Plesetsk	SL-8	40	115.1	1,453	1,465	74.0	Communications
Kosmos 1928	1988 016E	USSR	Mar 11	Plesetsk	SL-8	40	114.9	1,443	1,459	74.0	Communications
Kosmos 1929	1988 016F	USSR	Mar 11	Plesetsk	SL-8	40	114.7	1,427	1,458	74.0	Communications
Kosmos 1930	1988 016G	USSR	Mar 11	Plesetsk	SL-8	40	114.6	1,413	1,458	74.0	Communications
Kosmos 1931	1988 016H	USSR	Mar 11	Plesetsk	SL-8	40	114.4	1,396	1,458	74.0	Communications
Molniya 1-71	1988 017A	USSR	Mar 11	Tyuratam	SL-6	1,800	717.2	873	39,476	63.0	Domestic communications
Spacenet III	1988 018A	US	Mar 11	Kourou	Ariane 3	1,212	1,436.1	35,781	35,793	0.0	U.S. domestic communications. Located above 87 deg. w
Telecom 1C	1988 018B	France	Mar 11	Kourou	Ariane 3	1,210	1,436.1	35,779	35,795	0.0	French domestic, military communications. Located above 5 deg. e
Kosmos 1932	1988 019A	USSR	Mar 14	Tyuratam	SL-11	5,000	104.4	932	998	65.0	Nuclear powered Rorsat. Storage orbit
Kosmos 1933	1988 020A	USSR	Mar 15	Plesetsk	SL-14	1,600	97.7	628	658	82.5	Elint
IRS 1A	1988 021A	India	Mar 17	Tyuratam	SL-3	975	103.1	895	912	99.0	1st Soviet commercial launch. Indian remote sensing
Molniya 1-72	1988 022A	USSR	Mar 17	Plesetsk	SL-6	1,800	717.6	529	39,816	63.6	Domestic communications
Kosmos 1934	1988 023A	USSR	Mar 22	Plesetsk	SL-8	700	104.7	948	1,006	83.0	Navigation
Progress 35	1988 024A	USSR	Mar 23	Tyuratam	SL-4	7,240	91.2	326	340	51.6	Resupplied Mir. Docked 3/25, undocked and reentered 5/5
Kosmos 1935	1988 025A	USSR	Mar 24	Plesetsk	SL-4	7,000	89.2	171	297	67.2	Photo recon. Reentered 4/8
San Marco D	1988 026A	Italy	Mar 25	San Marco	Scout	236	93.4	263	615	3.0	Upper atmosphere studies, joint Italian/FRG/U.S. mission. Reentered 12/6
Kosmos 1936	1988 027A	USSR	Mar 30	Tyuratam	SL-4	7,000	89.7	227	292	64.8	Photo recon. Reentered 5/18
Gorizont 15	1988 028A	USSR	Mar 31	Tyuratam	SL-12	2,000	1,436.2	35,772	35,803	1.4	Communications. Located above 346 deg. e long.

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 1937	1988 029A	USSR	Apr 5	Plesetsk	SL-8	700	100.6	770	807	74.0	Store/dump communications
Kosmos 1938	1988 030A	USSR	Apr 11	Plesetsk	SL-4	6,300	89.6	221	287	72.9	Photo recon. Reentered 4/25
Foton 1	1988 031A	USSR	Apr 14	Plesetsk	SL-4	6,700	90.4	214	369	62.8	New name designation for materials processing satellites. Carried processing experiments for semiconductor materials, extra pure substances. Recovered 4/28
Kosmos 1939	1988 032A	USSR	Apr 20	Tyuratam	SL-3	2,000	97.4	617	660	97.9	Earth resources/remote sensing
None	1988 033A	US	Apr 26	WSMC	Scout	64	108.6	1,017	1,302	90.4	Stacked Oscars on Scout. Navigation. In storage orbit
None	1988 033B	US	Apr 26	WSMC	Scout	64	108.7	1,018	1,316	90.4	Stacked Oscars on Scout. Navigation. In storage orbit
Kosmos 1940	1988 034A	USSR	Apr 26	Tyuratam	SL-12	2,000	1,430.6	35,572	35,784	1.2	Oceanographic, atmospheric studies. Located above 12 deg. e; 1st Soviet satellite stationed in geosynchronous orbit over Western Hemisphere
Kosmos 1941	1988 035A	USSR	Apr 27	Tyuratam	SL-4	6,300	89.3	224	257	70.3	Photo recon. Reentered 5/11
Ekran 18	1988 036A	USSR	May 6	Tyuratam	SL-12	2,000	1,436.3	35,765	35,815	0.2	Domestic communications. Stationed above 99 deg. e long.
Kosmos 1942	1988 037A	USSR	May 12	Plesetsk	SL-4	7,000	89.4	159	329	67.1	Photo recon. Reentered 7/4
Progress 36	1988 038A	USSR	May 13	Tyuratam	SL-4	7,240	91.4	330	358	51.6	Resupplied Mir. Docked 5/15; undocked and reentered 6/5
Kosmos 1943	1988 039A	USSR	May 15	Tyuratam	SL-16		101.9	848	851	71.0	Elint
Intelsat VA F13	1988 040A	ITSO	May 17	Kourou	Ariane 3	2,013	1,436.1	35,756	35,817	0.0	Communications. Positioned above 53 deg. w long. Replaces Intelsat 5 F3
Kosmos 1944	1988 041A	USSR	May 18	Tyuratam	SL-4	7,000	89.2	213	259	64.8	Photo recon. Reentered 6/23
Kosmos 1945	1988 042A	USSR	May 19	Tyuratam	SL-4	6,300	90.0	229	318	70.4	Photo recon. Reentered 5/31
Kosmos 1946	1988 043A	USSR	May 21	Tyuratam	SL-12		675.3	19,111	19,147	64.9	Glonass navigation system
Kosmos 1947	1988 043B	USSR	May 21	Tyuratam	SL-12		675.2	19,120	19,138	64.9	Glonass navigation system
Kosmos 1948	1988 043C	USSR	May 21	Tyuratam	SL-12		675.2	19,120	19,138	64.9	Glonass navigation system

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Molniya 3-32	1988 044A	USSR	May 26	Plesetsk	SL-6	1,800	717.7	525	39,825	63.4	Domestic communications
Kosmos 1949	1988 045A	USSR	May 28	Tyuratam	SL-11	5,000	92.8	401	416	65.0	Elint. Reentered 4/23/90
Kosmos 1950	1988 046A	USSR	May 30	Plesetsk	SL-14	700	116.0	1,482	1,520	73.6	Geodetic
Kosmos 1951	1988 047A	USSR	May 31	Plesetsk	SL-4	6,300	89.9	259	275	82.3	Earth resources photo recon. Reentered 6/14
Soyuz TM-5	1988 048A	USSR	Jun 7	Tyuratam	SL-4	7,000	90.8	349	356	51.6	Carried Anatoli Solovyov, Viktor Savinykh, Alexander Alexandrov (Bulgarian) to Mir. Docked 6/9. Crew returned aboard TM-4, 6/17. TM-5 moved to forward port same day. Undocked 9/5 with Vladimir Lyakhov, Abdul Ahad Mohmand (TM-6). Two unsuccessful deorbit burns jeopardized crew safety, delayed landing 24 hrs. 3rd attempt ok, reentered 9/7
Kosmos 1952	1988 049A	USSR	Jun 11	Tyuratam	SL-4	6,300	89.6	227	283	70.0	Photo recon. Reentered 6/25
Kosmos 1953	1988 050A	USSR	Jun 14	Plesetsk	SL-14	1,600	97.7	633	667	82.5	Elint
Meteosat 3	1988 051A	ESA	Jun 15	Kourou	Ariane 4	696	1,436.3	35,786	35,794	0.9	1st Ariane 4 launch. Earth imaging, meteorological, environmental data transmission. Stationed above 0 deg. long.
Oscar 13	1988 051B	US	Jun 15	Kourou	Ariane 4	150	686.7	2,314	36,495	57.4	Joint West German, U.S., Japanese, Hungarian amateur radio satellite project
PAS-1	1988 051C	US	Jun 15	Kourou	Ariane 4	1,220	1,436.2	35,777	35,799	0.1	Communication service between U.S. and Europe, South America, Latin America and Caribbean. Stationed above 45 deg. w long.
Nova 3	1988 052A	US	Jun 16	WSMC	Scout	174	108.9	1,150	1,199	90.0	Navigation
Kosmos 1954	1988 053A	USSR	Jun 21	Plesetsk	SL-8	700	100.7	780	806	74.0	Store/dump communications
Kosmos 1955	1988 054A	USSR	Jun 22	Tyuratam	SL-4	7,000	89.9	189	355	64.8	Photo recon. Reentered 8/20
Kosmos 1956	1988 055A	USSR	Jun 23	Plesetsk	SL-4	6,300	91.5	332	368	82.3	Photo recon. Reentered 7/7
Okean 1	1988 056A	USSR	Jul 5	Plesetsk	SL-14	1,600	97.7	632	663	82.5	Oceanographic
Kosmos 1957	1988 057A	USSR	Jul 7	Plesetsk	SL-4	6,300	89.8	256	270	82.6	Earth resources photo recon. Reentered 7/21

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Phobos 1	1988 058A	USSR	Jul 7	Tyuratam	SL-12	6,220	Mars trajectory				1st of two 460-day missions to Mar's moon, Phobos. Communications lost 8/29
Phobos 2	1988 059A	USSR	Jul 12	Tyuratam	SL-12	6,220	Mars parking orbit				2nd of two lander missions to Phobos. Achieved Mars orbit, 1/29/89. Communications lost 3/89
SRS2 (Rohini)		India	Jul 13	Sriharikota	ASLV	150					1st staged failed 150 seconds into flight. Carried German/Indian Monocular Electro-Optical Stereo Scanner
Kosmos 1958	1988 060A	USSR	Jul 14	Plesetsk	SL-8		91.3	320	358	65.8	Military. Reentered 3/21/89
Progress 37	1988 061A	USSR	Jul 18	Tyuratam	SL-4	7,240	91.4	343	347	51.6	Resupplied Mir. Docked 7/20; undocked and reentered 8/12
Kosmos 1959	1988 062A	USSR	Jul 18	Plesetsk	SL-8	700	104.7	954	1,003	83.0	Navigation
Insat 1C	1988 063A	India	Jul 21	Kourou	Ariane 3	1,190	1,436.2	35,763	35,812	0.2	Telecommunications, meteorological data collection. Stationed above 93.5 deg. e long
ECS 5	1988 063B	ESA	Jul 21	Kourou	Ariane 3	1,185	1,436.2	32,109	39,482	0.2	European communications. Positioned above 13 deg. e long.
Meteor 3-2	1988 064A	USSR	Jul 26	Plesetsk	SL-14	2,000	109.3	1,186	1,208	82.5	Meteorological
Kosmos 1960	1988 065A	USSR	Jul 28	Plesetsk	SL-8		94.5	502	552	65.8	Calibration target. Decayed 4/9/90
Kosmos 1961	1988 066A	USSR	Aug 1	Tyuratam	SL-12	2,000	1,436.1	35,762	35,811	1.1	Communications. Stationed above 346 deg. e long.
FSW-12 (Fanhui Shi Weixing)	1988 067A	PRC	Aug 5	Jiuquan	CZ-2	1.85 t	89.5	204	296	63.0	Recoverable capsule containing German crystal growth experiment. Reentered 8/13
Kosmos 1962	1988 068A	USSR	Aug 8	Tyuratam	SL-4	6,300	89.7	230	285	70.0	Photo recon. Reentered 8/22
Molniya 1-73	1988 069A	USSR	Aug 12	Plesetsk	SL-6	1,800	717.8	504	39,834	63.1	Domestic communications
Kosmos 1963	1988 070A	USSR	Aug 16	Tyuratam	SL-4	6,700	89.7	173	347	64.8	Photo recon. Reentered 10/2
Gorizont 16	1988 071A	USSR	Aug 18	Tyuratam	SL-12	2,000	1,436.1	35,750	35,819	1.4	Domestic communications. Located above 80 deg. e long.
Kosmos 1964	1988 072A	USSR	Aug 23	Tyuratam	SL-4	6,300	89.7	230	285	70.0	Photo recon. Reentered 9/7
Kosmos 1965	1988 073A	USSR	Aug 23	Plesetsk	SL-4	6,300	89.7	252	271	82.3	Earth resources. Reentered 9/22

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
None	1988 074A	US	Aug 25	WSMC	Scout	59	107.4	1,032	1,177	90.0	Stacked Oscars on Scout. Navigation
None	1988 074B	US	Aug 25	WSMC	Scout	59	107.4	1,033	1,174	90.0	Stacked Oscars on Scout. Navigation
Soyuz TM-6	1988 075A	USSR	Aug 29	Tyuratam	SL-4	7,070	91.5	340	365	51.6	Carried Vladimir Lyakhov, Valeri Polyakov and Abdul Ahad Mohmand (Afghan). Docked 8/31. Lyakhov, Mohmand returned on TM-5. TM-6 returned 12/21 with Musa Manarov, Vladimir Titov (TM-4), Jean-Loup Chretien (TM-7). Return ends Manarov/Titov's record 365 days in space
Kosmos 1966	1988 076A	USSR	Aug 30	Plesetsk	SL-6	1,250	717.9	797	39,562	63.0	Early warning
USA 31	1988 077A	US	Sep 2	ESMC	Titan 34D		Elements not available				Final burn failed to place satellite in proper orbit
USA 32	1988 078A	US	Sep 5	WSMC	Titan II		Elements not available				1st stage explosion did not hamper mission
Kosmos 1967	1988 079A	USSR	Sep 6	Plesetsk	SL-4		89.5	228	275	72.9	Photo recon. Reentered 9/15
Feng Yun 1	1988 080A	PRC	Sep 6	Tai Yuan	CZ-4	750	102.7	877	899	99.2	Experimental weather satellite. 1st CZ-4 launch. New launch site
GSTAR 3	1988 081A	US	Sep 8	Kourou	Ariane 3	1,270	983.1	16,620	36,129	1.7	Commercial communications. Placed in elliptical orbit by malfunction during AKM firing. Satellite being boosted to operational orbit
SBS 5	1988 081B	US	Sep 8	Kourou	Ariane 3	1,241	1,436.1	35,786	35,788	0.0	Commercial communications. Located above 122 deg. w long.
Kosmos 1968	1988 082A	USSR	Sep 9	Plesetsk	SL-4	6,300	89.8	255	270	82.3	Photo recon. Reentered 9/23
Progress 38	1988 083A	USSR	Sep 9	Tyuratam	SL-4	7,240	91.5	336	384	51.6	Resupplied Mir. Docked 9/12; undocked and reentered 11/23
Kosmos 1969	1988 084A	USSR	Sep 15	Plesetsk	SL-4	7,000	89.6	168	348	67.1	Photo recon. Reentered 11/13
Kosmos 1970	1988 085A	USSR	Sep 16	Tyuratam	SL-12		675.7	19,115	19,144	64.8	Glonass navigation system
Kosmos 1971	1988 085B	USSR	Sep 16	Tyuratam	SL-12		675.7	19,115	19,145	64.8	Glonass navigation system
Kosmos 1972	1988 085C	USSR	Sep 16	Tyuratam	SL-12		675.7	19,118	19,141	64.8	Glonass navigation system

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
CS-3B (Sakura)	1988 086A	Japan	Sep 16	Tanegashima	H-1	1,100	1,436.2	35,786	35,790	0.1	Telephone communications Stationed above 136 deg. e long.
Horizon 1 (Offeq-1)	1988 087A	Israel	Sep 19	Negev	Shavit	155	98.8	250	1,150	142.9	1st Israeli launch. 3-stage rocket lifted experimental satellite, possible surveillance precursor. Decayed 1/14/89
Kosmos 1973	1988 088A	USSR	Sep 22	Plesetsk	SL-4	6,300	92.3	356	414	72.9	Photo recon. Reentered 10/10
NOAA 11	1988 089A	US	Sep 24	WSMC	Atlas E	1,712	102.0	845	863	98.9	Meteorological; Cospas/Sarsat search & rescue
Molniya 3-33	1988 090A	USSR	Sep 29	Plesetsk	SL-6	1,800	717.8	567	39,786	63.0	Domestic communications
STS-26	1988 091A	US	Sep 29	KSC	Discovery	21,054*	91.0	306	336	28.5	Crew: Fred Hauck, commander; Richard Covey, pilot; Mike Lounge, George Nelson, David Hilmers, mission specialists. Deployed TDRS 3; landed Edwards AFB, 10/3, after 4 days, 1 hr
TDRS 3	1988 091B	US	Sep 29	STS 26	IUS	2,200	1,436.3	35,779	35,803	0.2	Communications link between the shuttle, other orbiting satellites and the ground. Located at 171 deg. w long.
Kosmos 1974	1988 092A	USSR	Oct 3	Plesetsk	SL-6	1,250	717.7	639	39,712	62.9	Military
Kosmos 1975	1988 093A	USSR	Oct 11	Plesetsk	SL-14		97.7	631	666	82.5	Elint
Kosmos 1976	1988 094A	USSR	Oct 13	Plesetsk	SL-4	6,300	92.2	356	407	72.9	Photo recon. Reentered 10/27
Raduga 22	1988 095A	USSR	Oct 20	Tyuratam	SL-12	2,000	1,436.3	35,774	35,805	1.3	Domestic communications. Located above 35 deg. e
Kosmos 1977	1988 096A	USSR	Oct 25	Plesetsk	SL-6	1,250	718.2	693	39,674	62.9	Military
Kosmos 1978	1988 097A	USSR	Oct 27	Plesetsk	SL-4	6,300	89.6	226	279	72.9	Photo recon. Reentered 11/10
TDF-1	1988 098A	France	Oct 28	Kourou	Ariane 2	2,136	1,436.1	35,770	35,804	0.0	French direct broadcast; part of French/German effort. Located above 19 deg. w
USA 33	1988 099A	US	Nov 6	WSMC	Titan 34D		Elements not available				

* Payload weight. Orbiter/cargo weight was 115,336 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Buran	1988 100A	USSR	Nov 15	Tyuratam	SL-17	73,000*	89.5	248	256	51.6	Unmanned test flight of Soviet shuttle. Orbited 3 hrs, 25 mns, touched down 11/15 at Baikonur Cosmodrome
Kosmos 1979	1988 101A	USSR	Nov 18	Tyuratam	SL-11		92.7	402	416	65.0	Ocean surveillance. Reentered 12/25/89
Kosmos 1980	1988 102A	USSR	Nov 23	Tyuratam	SL-16		101.9	849	854	71.0	Elint
Kosmos 1981	1988 103A	USSR	Nov 24	Plesetsk	SL-4	6,300	89.4	223	267	62.8	Photo recon. Reentered 12/8
Soyuz TM-7	1988 104A	USSR	Nov 26	Tyuratam	SL-4	7,000	91.6	325	350	51.6	Carried Alexander Volkov, Sergei Krikalev and Jean-Loup Chretien (French). Docked 11/28. Chretien returned aboard TM-6 12/21. Returned with Soviet crew 4/27/89 after 151 days, 11 hrs, 8 mn.
Kosmos 1982	1988 105A	USSR	Nov 30	Tyuratam	SL-4	6,300	92.2	347	414	70.0	Photo recon. Reentered 12/14
STS-27	1988 106A	US	Dec 2	KSC	Atlantis		93.6	443	453	57.0	Crew: Navy Cdr. Robert Gibson, commander; AF Lt. Col. Guy Gardner, pilot; AF Col Mike Mullane, AF Lt. Col Jerry Ross, Navy Cdr William Shepard, mission specialists. Launched military payload. Landed Edwards AFB, 12/6, after 4 days, 9 hrs, 6 mns.
USA 34	1988 106B	US	Dec 2		STS-27		Elements not available				
Kosmos 1983	1988 107A	USSR	Dec 8	Plesetsk	SL-4	2,500	89.1	203	258	62.8	Photo recon. Reentered 12/22
Ekran 19	1988 108A	USSR	Dec 10	Tyuratam	SL-12	2,000	1,436.1	35,764	35,803	1.4	Domestic communications. Stationed above 99 deg e
Skynet 4B	1988 109A	UK	Dec 11	Kourou	Ariane 4	1,433	1,413.3	34,887	35,790	3.0	British military communications. Stationed above 1 deg. w
Astra 1A	1988 109B	Lux	Dec 11	Kourou	Ariane 4	1,780	1,419.6	35,164	35,762	0.0	European TV broadcast. Located above 19.2 w
Kosmos 1984	1988 110A	USSR	Dec 16	Plesetsk	SL-4	6,300	89.6	164	332	62.8	Photo recon. Reentered 2/13/89
STTW-3	1988 111A	PRC	Dec 22	Xi Chang	CZ-3	900	1,436.1	35,783	36,788	0.6	Domestic communications. Stationed above 110 deg. e
Molniya 3-34	1988 112A	USSR	Dec 22	Plesetsk	SL-6	1,800	717.3	447	39,883	62.8	Domestic communications

* At OMS-2

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 1985	1988 113A	USSR	Dec 23	Plesetsk	SL-14		95.1	522	533	73.5	Military
Progress 39	1988 114A	USSR	Dec 25	Tyuratam	SL-4	7,240	91.3	326	350	51.6	Resupplied Mir. Docked 12/27. Undocked, reentered 2/7/89
Molniya 1-74	1988 115A	USSR	Dec 28	Plesetsk	SL-6	1,800	717.4	623	39,721	62.8	Soviet domestic communications
Kosmos 1986	1988 116A	USSR	Dec 29	Tyuratam	SL-4	6,700	89.3	211	265	64.8	Photo recon. Reentered 2/11/89
Kosmos 1987	1989 001A	USSR	Jan 10	Tyuratam	SL-12	1,400	675.7	19,117	19,142	64.9	Glonass navigation system
Kosmos 1988	1989 001B	USSR	Jan 10	Tyuratam	SL-12	1,400	675.7	19,119	19,141	64.9	Glonass navigation system
Kosmos 1989	1989 001C	USSR	Jan 10	Tyuratam	SL-12	1,415	675.5	19,102	19,149	64.9	Geodetic. 1st in Etalon series
Kosmos 1990	1989 002A	USSR	Jan 12	Plesetsk	SL-4	6,300	89.8	259	268	82.6	Photo recon. Reentered 2/11
Kosmos 1991	1989 003A	USSR	Jan 18	Tyuratam	SL-4	6,300	92.2	347	414	70.0	Photo recon. Reentered 2/1
Gorizont 17	1989 004A	USSR	Jan 26	Tyuratam	SL-12	2,120	1,436.2	35,776	35,804	1.5	Communications. Located above 53 deg. e
Kosmos 1992	1989 005A	USSR	Jan 26	Plesetsk	SL-8	900	100.7	772	807	74.1	Store/dump communications
Intelsat VA F15	1989 006A	ITSO	Jan 27	Kourou	Ariane 2	1,977	1,436.1	35,775	35,799	0.0	International communications. Last in VA series. Stationed above 60 deg. e long. Moved to 18 w in 1991
Kosmos 1993	1989 007A	USSR	Jan 28	Tyuratam	SL-4	6,500	89.6	173	361	64.7	Photo recon. Reentered 3/27
Progress 40	1989 008A	USSR	Feb 10	Tyuratam	SL-4	7,250	91.6	347	363	51.6	Resupplied Mir. Docked 2/12; undocked 3/3; reentered 3/5
Kosmos 1994	1989 009A	USSR	Feb 10	Plesetsk	SL-14	100	113.9	1,393	1,414	82.6	Communications
Kosmos 1995	1989 009B	USSR	Feb 10	Plesetsk	SL-14	100	114.1	1,410	1,415	82.6	Communications
Kosmos 1996	1989 009C	USSR	Feb 10	Plesetsk	SL-14	100	114.0	1,404	1,414	82.6	Communications
Kosmos 1997	1989 009D	USSR	Feb 10	Plesetsk	SL-14	100	113.9	1,398	1,414	82.6	Communications
Kosmos 1998	1989 009E	USSR	Feb 10	Plesetsk	SL-14	100	113.8	1,388	1,414	82.6	Communications
Kosmos 1999	1989 009F	USSR	Feb 10	Plesetsk	SL-14	100	113.7	1,382	1,414	82.6	Communications
Kosmos 2000	1989 010A	USSR	Feb 10	Plesetsk	SL-4	6,300	91.9	339	391	82.4	Photo recon. Reentered 3/2
Kosmos 2001	1989 011A	USSR	Feb 14	Plesetsk	SL-6	1,900	717.7	623	39,728	62.8	Early warning

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 2002	1989 012A	USSR	Feb 14	Plesetsk	SL-8	500	110.3	185	2,307	65.8	Minor military. Reentered 10/15
GPS 2-1	1989 013A	US	Feb 14	ESMC	Delta	1,665	718.0	20,018	20,346	55.1	2nd generation Navstar Global Positioning System satellite
Molniya 1-75	1989 014A	USSR	Feb 15	Plesetsk	SL-6	1,800	717.8	458	39,901	62.9	Domestic communications
Kosmos 2003	1989 015A	USSR	Feb 17	Plesetsk	SL-4	6,300	89.5	233	267	62.8	Photo recon. Reentered 3/3
Exos-D	1989 016A	Japan	Feb 21	Kagoshima	M-3S-2	295	205.1	262	10,021	75.1	Scientific. Studying Aurora Borealis, Auroral Australis
Kosmos 2004	1989 017A	USSR	Feb 22	Plesetsk	SL-8	825	105.0	974	1,018	82.9	Navigation
Meteor 2-18	1989 018A	USSR	Feb 28	Plesetsk	SL-14	1,500	104.1	941	960	82.5	Meteorological
Kosmos 2005	1989 019A	USSR	Mar 2	Plesetsk	SL-4	6,500	89.6	189	326	62.8	Photo recon. Reentered 4/25
JCSAT 1	1989 020A	Japan	Mar 6	Kourou	Ariane 44LP	2,280	1,436.1	35,773	35,800	0.6	Japanese domestic communcations. Operational above 150 deg. e long.
MOP-1	1989 020B	ESA	Mar 6	Kourou	Ariane 44LP	681	1,436.2	35,779	35,798	0.7	Meteosat Operational Program. Weather imaging, environmental, atmospheric data. Geostationary at 0 deg.
STS-29	1989 021A	US	Mar 13	KSC	Discovery	119,269*	91.0	305	337	28.5	Crew: Michael Coats, commander; John Blaha, pilot; James Buchli, Robert Springer, James Bagian, mission specialists. Deployed TDRS 4. Landed 3/18 after 4 days, 23 hrs, 39 mns.
TDRS 4	1989 021B	US	Mar 13	STS-29	IUS	2,120	1,436.1	35,768	35,808	0.0	Satellite to satellite communications link. Located above 41 deg. w long.
Kosmos 2006	1989 022A	USSR	Mar 16	Plesetsk	SL-4	6,300	91.9	320	380	62.8	Photo recon. Reentered 3/30
Progress 41	1989 023A	USSR	Mar 16	Tyuratam	SL-4	7,250	91.0	348	363	51.6	Resupplied Mir. Docked 3/18; undocked 4/21. Reentered 4/25
Kosmos 2007	1989 024A	USSR	Mar 23	Tyuratam	SL-4	7,000	89.4	229	283	64.7	Photo recon. Reentered 9/22
Kosmos 2008	1989 025A	USSR	Mar 24	Plesetsk	SL-8	40	114.5	1,394	1,471	74.0	Tactical military comm.
Kosmos 2009	1989 025B	USSR	Mar 24	Plesetsk	SL-8	40	114.7	1,409	1,473	74.0	Tactical military comm.

*Orbiter/cargo weight. Total launch weight including fuel, boosters, 2,049,888 kg.

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 2010	1989 025C	USSR	Mar 24	Plesetsk	SL-8	40	114.8	1,425	1,472	74.0	Tactical military comm.
Kosmos 2011	1989 025D	USSR	Mar 24	Plesetsk	SL-8	40	115.0	1,440	1,472	74.0	Tactical military comm.
Kosmos 2012	1989 025E	USSR	Mar 24	Plesetsk	SL-8	40	115.2	1,457	1,472	74.0	Tactical military comm.
Kosmos 2013	1989 025F	USSR	Mar 24	Plesetsk	SL-8	40	115.4	1,465	1,481	74.0	Tactical military comm.
Kosmos 2014	1989 025G	USSR	Mar 24	Plesetsk	SL-8	40	115.6	1,470	1,491	74.0	Tactical military comm.
Kosmos 2015	1989 025H	USSR	Mar 24	Plesetsk	SL-8	40	114.7	1,470	1,511	74.0	Tactical military comm.
USA 36	1989 026A	US	Mar 24	ESMC	Delta		94.5	487	499	47.7	
Tele-X	1989 027A	Sweden	Apr 2	Kourou	Ariane 2	2,142	1,436.1	35,664	35,908	0.0	TV, business communications to Nordic countries. Located above 5 deg. e long.
Kosmos 2016	1989 028A	USSR	Apr 4	Plesetsk	SL-8	825	104.8	957	1,014	82.9	Navigation
Kosmos 2017	1989 029A	USSR	Apr 6	Plesetsk	SL-4	6,300	89.6	246	269	62.8	Photo recon. Reentered 4/19
Raduga 23	1989 030A	USSR	Apr 14	Tyuratam	SL-12	1,965	1,435.1	35,767	35,796	1.4	Domestic communications. Stationed over 336 deg. e
Kosmos 2018	1989 031A	USSR	Apr 20	Plesetsk	SL-4	6,500	89.9	181	352	62.8	Photo recon. Reentered 6/19
Foton 2	1989 032A	USSR	Apr 26	Plesetsk	SL-4	6,200	90.5	216	380	62.8	Materials processing. Carried French microgravity exp. Reentered 5/11
STS-30	1989 033A	US	May 4	KSC	Discovery	98,533*	90.8	297	331	28.9	Crew: David Walker, commander; Ronald Grabe, pilot; Mark Lee, Norman Thagard, Mary Cleave, mission specialists. Deployed Magellan. Returned 5/8 after 4 days, 56 mns.
Magellan	1989 033B	US	May 5	STS	IUS	3,444	Trans-Venus trajectory				
Kosmos 2019	1989 034A	USSR	May 5	Plesetsk	SL-4	6,300	89.9	187	355	62.8	Photo recon. Reentered 5/18
USA 37	1989 035A	US	May 10	ESMC	Titan 34D		Elements not available				
Kosmos 2020	1989 036A	USSR	May 17	Tyuratam	SL-4	6,500	89.6	172	337	64.8	Photo recon. Reentered 7/15
Kosmos 2021	1989 037A	USSR	May 24	Tyuratam	SL-4	6,500	89.4	213	277	64.9	Topographic mapping. Reentered 7/6

*Total liftoff weight was 2,049,877 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Resurs-F 1	1989 038A	USSR	May 25	Plesetsk	SL-4	6,300	89.7	254	273	82.3	Remote sensing. Deployed 2 subsatellites. Reentered 6/17
Pion 1	1989 038C	USSR	Jun 9	Resurs-F	SL-4	78	89.7	257	270	82.3	Passive atmospheric research subsatellite. Reentered 7/23
Pion 2	1989 038D	USSR	Jun 9	Resurs-F	SL-4	78	89.7	257	268	82.3	Passive atmospheric research subsatellite. Reentered 7/24
Kosmos 2022	1989 039A	USSR	May 31	Tyuratam	SL-12	1,400	675.7	19,124	19,137	64.8	Glonass navigation system
Kosmos 2023	1989 039B	USSR	May 31	Tyuratam	SL-12	1,400	675.7	19,095	19,165	64.8	Glonass navigation system
Kosmos 2024	1989 039C	USSR	May 31	Tyuratam	SL-12	1,415	675.4	19,106	19,139	64.8	Geodetic. 2nd in series (Etalon)
Kosmos 2025	1989 040A	USSR	Jun 1	Plesetsk	SL-4	6,300	89.5	179	356	62.8	Photo recon. Reentered 6/15
Superbird A	1989 041A	Japan	Jun 5	Kourou	Ariane 44L	2,489	1,436.2	35,776	35,799	0.0	Japanese domestic business communications. Located above 158 deg. e
DFS-1	1989 041B	FRG	Jun 5	Kourou	Ariane 44L	1,416	1,436.1	35,775	35,800	0.0	Multi-purpose telecommunications. Located above 23.5 deg. e long.
Kosmos 2026	1989 042A	USSR	Jun 7	Plesetsk	SL-8	825	104.7	950	1,007	82.9	Navigation
Molniya 3-35	1989 043A	USSR	Jun 8	Plesetsk	SL-6	1,800	717.8	594	39,763	62.8	Domestic communications
GPS 2-2	1989 044A	US	Jun 10	ESMC	Delta	1,665	718.0	19,962	20,401	54.7	2nd generation Navstar Global Positioning System satellite
Kosmos 2027	1989 045A	USSR	Jun 14	Plesetsk	SL-8	900	94.6	483	519	65.8	Minor military
USA 39	1989 046A	US	Jun 14	ESMC	Titan 4		Elements not available				First Titan 4 launch
Kosmos 2028	1989 047A	USSR	Jun 16	Tyuratam	SL-4	6,300	89.6	229	287	69.9	Photo recon. Reentered 7/6
Raduga 1-1	1989 048A	USSR	Jun 21	Tyuratam	SL-12	1,965	1,436.2	35,765	35,814	1.4	Domestic communications. Possibly a new series. Positioned above 49 deg. e
Resurs-F 2	1989 049A	USSR	Jun 27	Plesetsk	SL-4	6,300	89.6	260	274	82.5	Remote sensing. Reentered 7/11
Nadezhda 1	1989 050A	USSR	Jul 4	Plesetsk	SL-8	825	104.8	957	1,011	83.0	Navigation; carries COSPAS/SARSAT transponder
Kosmos 2029	1989 051A	USSR	Jul 5	Plesetsk	SL-4	6,300	91.5	334	358	82.4	Photo recon. Reentered 7/19

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Gorizont 18	1989 052A	USSR	Jul 5	Tyuratam	SL-12	2,120	1,436.0	35,772	35,798	1.5	Domestic communications. Located above 140 deg. e
Olympus	1989 053A	ESA	Jul 12	Kourou	Ariane 3	2,595	1,436.2	35,767	35,808	0.0	European high-power commsat technology demonstration. 1st European satellite using 20/30 GHz. Stationed above 19 deg. w long.
Kosmos 2030	1989 054A	USSR	Jul 12	Plesetsk	SL-4	6,500	89.6	164	351	67.1	Photo recon. Destroyed by ground command. Reentered 7/28
Resurs-F 3	1989 055A	USSR	Jul 18	Plesetsk	SL-4	6,300	89.8	260	275	82.5	Remote sensing. Deployed 2 subsatellites. Reentered 8/8
Pion 3	1989 055C	USSR	Aug 7	Resurs-F	SL-4	78	89.7	254	272	82.5	Passive atmospheric research subsatellite. Reentered 9/19
Pion 4	1989 055D	USSR	Aug 7	Resurs-F	SL-4	78	89.7	255	272	82.5	Passive atmospheric research subsatellite. Reentered 9/19
Kosmos 2031	1989 056A	USSR	Jul 18	Tyuratam	SL-4	6,500	89.3	234	254	50.5	Photo recon. Destroyed by ground command, reentered 9/15
Kosmos 2032	1989 057A	USSR	Jul 20	Plesetsk	SL-4	6,300	89.9	233	364	82.3	Photo recon. Reentered 8/3
Kosmos 2033	1989 058A	USSR	Jul 24	Tyuratam	SL-11	4,000	92.7	404	418	65.0	Eorsat, ocean recon. Decayed 1/6/91
Kosmos 2034	1989 059A	USSR	Jul 25	Plesetsk	SL-8	825	104.9	969	1,013	82.9	Navigation
Kosmos 2035	1989 060A	USSR	Aug 2	Plesetsk	SL-4	6,300	90.3	231	357	82.5	Photo recon. Reentered 8/16
STS-28	1989 061A	US	Aug 8	KSC	Columbia		90.5	314	317	56.9	Crew: Brewster Shaw, commander; Richard Richards, pilot; David Leestma, James Adamson, Mark Brown, mission specialists. Deployed DoD payload. Reentered 8/13, after 5 days, 1 hr.
USA 40	1989 061B	US	Aug 8		Columbia		Elements not available				
USA 41	1989 061C	US	Aug 8		Columbia		Elements not available				
TV Sat 2	1989 062A	ESA	Aug 8	Kourou	Ariane 44LP	2,130	1,436.2	35,772	35,804	0.0	Direct TV broadcast to West Germany, parts of Europe. Positioned above 19 deg. w long.

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Hipparcos	1989 062B	ESA	Aug 8	Kourou	Ariane 44LP	1,130	639.7	542	35,889	6.9	Scientific. Measure positions of stars. Failed to reach geosynch due to AKM malfunction. Good data returned from modified transfer orbit
Resurs-F 4	1989 063A	USSR	Aug 15	Plesetsk	SL-4	6,300	89.7	259	268	82.3	Remote sensing. Reentered 9/14
GPS 2-3	1989 064A	US	Aug 18	ESMC	Delta	1,665	718.0	20,111	20,252	55.0	Navstar Global Positioning System
Kosmos 2036	1989 065A	USSR	Aug 22	Plesetsk	SL-4	6,300	89.9	250	297	62.8	Photo recon. Reentered 9/5
Progress M-1	1989 066A	USSR	Aug 23	Tyuratam	SL-4	7,250	92.3	382	397	51.6	New cargo ship. Resupplied Mir. Docked 8/25; undocked and reentered 12/1
Marcopolo 1	1989 067A	UK	Aug 27	ESMC	Delta1	1,220	1,436.2	35,785	35,791	0.0	British direct broadcast. 1st commercial launch for U.S. launcher. Stationed above 31 deg. w
Kosmos 2037	1989 068A	USSR	Aug 28	Plesetsk	SL-14	900	116.1	1,485	1,525	73.5	Geodetic (GEO-IK)
USA 43	1989 069A	US	Sep 4	ESMC	Titan 3		Elements not available				
USA 44	1989 069B	US	Sep 4	ESMC	Titan 3		Elements not available				
GMS-4	1989 070A	Japan	Sep 5	Tanegashima	H-1	725	1,436.1	35,780	35,792	1.4	Japanese meteorological satellite. Stationed above 140 deg. e
Soyuz TM-8	1989 071A	USSR	Sep 5	Tyuratam	SL-4	7,150	91.3	380	395	51.6	Transported Alexander Viktorenko, Alexander Serebrov to Mir. Docked 9/7. Returned with crew 2/19/90, after 166 days, 6 hrs, 58 mn.
USA 45	1989 072A	US	Sep 6	WSMC	Titan 2		Elements not available				
Resurs-F 5	1989 073A	USSR	Sep 6	Plesetsk	SL-4	6,300	89.9	262	273	82.3	Remote sensing. Carried Cossima microgravity exp. for FRG. Reentered 9/22
Kosmos 2038	1989 074A	USSR	Sep 14	Plesetsk	SL-14	100	113.8	1,415	1,433	82.5	Communications
Kosmos 2039	1989 074B	USSR	Sep 14	Plesetsk	SL-14	100	113.8	1,412	1,431	82.5	Communications
Kosmos 2040	1989 074C	USSR	Sep 14	Plesetsk	SL-14	100	114.1	1,425	1,443	82.5	Communications
Kosmos 2041	1989 074D	USSR	Sep 14	Plesetsk	SL-14	100	113.9	1,415	1,436	82.5	Communications
Kosmos 2042	1989 074E	USSR	Sep 14	Plesetsk	SL-14	100	113.9	1,420	1,436	82.5	Communications

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 2043	1989 074F	USSR	Sep 14	Plesetsk	SL-14	100	114.0	1,422	1,440	82.5	Communications
Kosmos 2044	1989 075A	USSR	Sep 15	Plesetsk	SL-4	6,000	89.2	207	267	82.3	Life sciences. Housed monkeys, rats, fish, insects, plants. 29 U.S./Soviet cooperative experiments conducted on returned specimens. Reentered 9/29
Kosmos 2045	1989 076A	USSR	Sep 22	Tyuratam	SL-4	6,300	89.1	235	390	69.9	Photo recon. Reentered 10/2
FltSatCom F-8	1989 077A	US	Sep 25	ESMC	Atlas Centaur	2,310	1,436.2	35,776	35,799	4.8	Military communications. Last in a series of 8. Final Atlas launch for NASA
Molniya 1-76	1989 078A	USSR	Sep 27	Plesetsk	SL-6	1,800	717.5	636	39,704	62.9	Domestic communications
Kosmos 2046	1989 079A	USSR	Sep 27	Tyuratam	SL-11	4,000	92.8	405	417	65.0	Eorsat. Ocean recon. Decayed 4/16/91
Interkosmos 24 (Activny)	1989 080A	USSR	Sep 28	Plesetsk	SL-14	1,000	115.9	505	2,492	82.6	Particles & fields exps. U.S. participation
Magion-2	1989 080B	USSR	Oct 3	Plesetsk	SL-14	50	115.9	504	2,494	82.5	Czechoslovakian-built subsatellite. Receives signals from Interkosmos 24 for propagation exp.
Gorizont 19	1989 081A	USSR	Sep 28	Tyuratam	SL-12	2,120	1,436.8	35,783	35,792	1.4	Domestic communications. Located above 97.5 deg. e
Kosmos 2047	1989 082A	USSR	Oct 3	Plesetsk	SL-4	6,500	89.5	167	333	67.1	Photo recon. Reentered 11/21
Kosmos 2048	1989 083A	USSR	Oct 17	Plesetsk	SL-4	6,300	90.4	239	359	62.8	Photo recon. Reentered 10/26
STS-34	1989 084A	US	Oct 18	KSC	Atlantis	119,943*	90.5	295	323	34.3	Crew: Donald Williams, commander; Michael McCulley, pilot; Shannon Lucid, Franklin Chang-Diaz, Ellen Baker, mission specialists. Deployed Galileo. Landed 10/23 after 4 days, 23 hrs, 39 mns.
Galileo	1989 084B	US	Oct 18	STS	IUS	3,881**	Venus-Earth-Earth-Gravity-Assist trajectory				Jupiter probe with flybys of Venus, earth, an asteroid before arriving at fifth planet, 12/95. Venus flyby 2/90. Data will be returned 11/90 as spacecraft nears earth
GPS 2-4	1989 085A	US	Oct 21	ESMC	Delta	1,665	719.9	20,079	20,283	54.7	Navstar Global Positioning System
Meteor 3-3	1989 086A	US	Oct 24	Plesetsk	SL-14	2,150	109.4	1,190	1,213	82.5	Meteorological

*Total liftoff weight was 2,049,285 kg

**Includes 335-kg probe

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Intelsat VI-2	1989 087A	ITSO	Oct 27	Kourou	Ariane 44L	4,215	1,436.1	35,737	35,837	0.1	New generation Intelsat. Positioned above 24.5 deg. e. Moved to 60 e, 1991
Kosmos 2049	1989 088A	USSR	Nov 17	Plesetsk	SL-4	7,000	89.3	235	289	64.7	Photo recon. Reentered 6/19/90
COBE	1989 089A	US	Nov 18	WSMC	Delta	2,265	102.8	886	895	99.0	Cosmic Background Explorer. Measuring infrared radiation
STS-33	1989 090A	US	Nov 23	KSC	Discovery		Elements not available				Crew: Frederick Gregory, commander; John Blaha, pilot; Manley Carter, Story Musgrave, Kathryn Thornton, mission specialists. Deployed DoD payload. Landed 11/28 after 5 days, 8 mns
None	1989 090B	US	Nov 23	STS	IUS		Elements not available				
Kosmos 2050	1989 091A	USSR	Nov 23	Plesetsk	SL-6	1,900	717.9	616	39,747	63.0	Early warning
Kosmos 2051	1989 092A	USSR	Nov 24	Tyuratam	SL-11	4,000	92.8	405	416	64.9	Eorsat. Ocean recon. Decayed 1/21/91
Kvant 2	1989 093A	USSR	Nov 26	Tyuratam	SL-13	19,565	92.4	394	399	51.6	Mir service expansion module. Docked with front axial port 12/6; moved by docking arm to upper radial port 12/8
Molniya 3-36	1989 094A	USSR	Nov 28	Plesetsk	SL-6	1,800	717.8	662	39,694	62.8	Domestic communications
Kosmos 2052	1989 095A	USSR	Nov 30	Plesetsk	SL-4	6,500	89.4	181	345	67.1	Photo recon. Reentered 1/24/90
Granat	1989 096A	USSR	Dec 1	Tyuratam	SL-12	3.5 t	5,928.0	1,764	202,482	51.8	X-ray, gamma ray observatory studying high-energy emissions. Carries French, Bulgarian, Danish exp.
GPS 2-5	1989 097A	US	Dec 11	ESMC	Delta 2	1,665	718.1	20,010	20,359	54.9	Navstar Global Positioning System
Raduga 24	1989 098A	USSR	Dec 15	Tyuratam	SL-12	1,965	1,436.3	35,767	35,815	1.5	Domestic communications. Stationed above 45 deg. e
Progress M-2	1989 099A	USSR	Dec 20	Tyuratam	SL-4	7,250	92.4	393	395	51.6	Resupplied Mir. Docked 12/22. Carried U.S. microgravity payload. Reentered 2/9/90
Kosmos 2053	1989 100A	USSR	Dec 27	Plesetsk	SL-14	3,000	95.1	512	534	73.5	Minor Military
Kosmos 2054	1989 101A	USSR	Dec 27	Tyuratam	SL-3	2,150	1,435.8	35,706	35,859	1.4	Communications. Located above 346 deg. e
Skynet 4A	1990 001A	UK	Jan 1	ESMC	Titan III	1,463	1,430.7	34,897	36,462	2.7	British military communications. Stationed above 6 deg. e

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
JCSat	1990 001B	Japan	Jan 1	ESMC	Titan III	2,280	1,436.2	35,780	35,796	0.0	Japanese domestic communications. Positioned above 154 deg. e
STS-32	1990 002A	US	Jan 9	KSC	Columbia	116,271*	90.8	296	361	28.5	Crew: Daniel Brandenstein, commander; James Wetherbee, pilot; Bonnie Dunbar, Marsha Ivins, David Low, mission specialists. Deployed Leasat 5, retrieved LDEF. Landed 1/20 after 10 days, 21 hrs
Leasat 5	1990 002B	US	Jan 10	STS		7,711	1,436.1	35,774	35,799	3.0	Military communications. Stationed above 177 deg. w
Kosmos 2055	1990 003A	USSR	Jan 17	Plesetsk	SL-4	6,300	89.6	251	280	62.8	Photo recon. Reentered 1/29
Kosmos 2056	1990 004A	USSR	Jan 18	Plesetsk	SL-8	900	100.7	772	806	74.0	Military communications
SPOT 2	1990 005A	France	Jan 22	Kourou	Ariane 4	1,870	101.3	821	823	98.7	2nd in series of French remote sensing satellites
Uosat 3	1990 005B	UK	Jan 22	Kourou	Ariane 4	45.5	100.8	785	800	96.7	Experimental communications payloads for University of Surrey
Uosat 4	1990 005C	UK	Jan 22	Kourou	Ariane 4	47.5	100.7	786	800	89.7	Test transponders, solar cells, CCD camera for University of Surrey. Communications lost 30 hrs into the mission
Microsat 1	1990 005D	US	Jan 22	Kourou	Ariane 4	12	100.7	784	800	98.7	Amsat amateur radio satellite. Digital message communications. Named Pacsat after launch
Microsat 2	1990 005E	Brazil	Jan 22	Kourou	Ariane 4	12	100.7	784	799	98.7	Amsat amateur radio satellite. Digital Orbiting Voice Encoder (DOVE). Synthesized voice messages received by students with portable receivers
Microsat 3	1990 005F	US	Jan 22	Kourou	Ariane 4	12	100.7	783	800	98.7	Amsat amateur radio satellite. Photographs and transmits earth images. Also called Webersat for Utah's Weber State College, the satellite developer
Microsat 4	1990 005G	Argnta	Jan 22	Kourou	Ariane 4	12	100.7	783	800	98.7	Amsat amateur radio satellite. CCD camera for earth photography. Called Lusat after launch
Molniya 3-37	1990 006A	USSR	Jan 23	Plesetsk	SL-6	1,750	717.6	434	39,912	62.7	Soviet domestic communications

*Total liftoff weight, 2,049,160 kg.

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Muses A	1990 007A	Japan	Jan 24	Kagoshima	Mu-3S-II	185	Lunar swingby trajectory				Also called Hiten. Injected lunar orbiter around moon mid-March
Hagoromo	1990 007B	Japan	Mar 19	Muses A		12	Lunar orbit				Lunar orbiter ejected from Muses A for trajectory, telemetry tests. Contact lost after release
GPS 2-6	1990 008A	US	Jan 24	ESMC	Delta 2	1,665	718.0	20,029	20,337	54.6	Global Positioning System
Kosmos 2057	1990 009A	USSR	Jan 25	Plesetsk	SL-4	6,500	89.7	195	349	62.8	Photo recon. Reentered 3/19
Kosmos 2058	1990 010A	USSR	Jan 30	Plesetsk	SL-14	2,000	97.8	634	665	82.5	Elint
PRC 26	1990 011A	PRC	Feb 4	Xichang	CZ-3	1,024	1,436.1	35,782	35,788	0.1	Domestic communications. Stationed above 98.5 deg. e. Chinese name: Shiyang Tongbu Tonxin Weixing
Kosmos 2059	1990 012A	USSR	Feb 6	Tyuratam	SL-14	500	110.0	191	2,276	65.8	Minor military. Reentered 11/12
MOS 1B	1990 013A	Japan	Feb 7	Tanegashima	H-1	740	103.3	908	909	99.2	Marine observation satellite. Called Momo 1B after launch
Debut	1990 013B	Japan	Feb 7	Tanegashima	H-1	50	112.2	909	1,742	99.0	Boom/umbrella test. Called Orizuru after launch
JAS 1B	1990 013C	Japan	Feb 7	Tanegashima	H-1	50	112.2	909	1,742	99.0	Amateur radio satellite. Called Fuji 2 after launch
Soyuz TM-9	1990 014A	USSR	Feb 11	Tyuratam	SL-4	7,150	92.5	379	411	51.6	Ferried Anatoli Solovyov and Alexander Balandin to Mir. Docked 2/13. Returned cosmonauts 8/9. Flight time: 179 days, 1 hr, 18 mn
LACE	1990 015A	US	Feb 14	ESMC	Delta 2	1,430	95.2	514	539	43.1	Low-power Atmospheric Compensation Experiment for Strategic Defense Initiative Office (SDIO)
RME	1990 015B	US	Feb 14	ESMC	Delta 2	1,040	93.4	428	456	43.1	Relay Mirror Experiment for SDIO
Raduga 25	1990 016A	USSR	Feb 15	Tyuratam	SL-12	1,965	1,436.0	35,774	35,795	0.7	Domestic communications. Located above 70 deg. e
Superbird/ BS2X		Japan	Feb 22	Kourou	Ariane 4						Launch failure. Blockage in water line decreased thrust in 1st stage motor. Vehicle exploded 100 sec after liftoff
Nadezdha 2	1990 017A	USSR	Feb 27	Plesetsk	SL-8	825	104.8	956	1,018	83.0	Navigation. COSPAR/SARSAT transponder
Okean 2	1990 018A	USSR	Feb 28	Plesetsk	SL-14	1,900	97.6	632	658	82.5	Oceanographic remote sensing

Summary Log of Space Launches 1990

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
STS-36	1990 019A	US	Feb 28	KSC	Atlantis		89.4	248	264	62.0	Crew: John Creighton, commander; John Casper, pilot; David Hilmers, Richard Mullane, Pierre Thuot, mission specialists. Deployed one payload. Landed 3/4 after 4 days, 10 hrs, 18 mns
USA 53	1990 019B	US	Feb 28	STS		Elements not available					
Progress M-3	1990 020A	USSR	Feb 28	Tyuratam	SL-4	7,250	88.4	277	331	51.6	Resupplied Mir. Docked 3/3. Undocked, reentered 4/28
Intelsat 6 F3	1990 021A	ITSO	Mar 14	ESMC	Titan III	4,215	95.9	552	571	28.3	International communications. 2nd stage separation failure cast it into non-operational orbit
Kosmos 2060	1990 022A	USSR	Mar 14	Tyuratam	SL-11	4,000	92.7	402	415	65.0	Ocean recon. Decayed 9/1/91
Kosmos 2061	1990 023A	USSR	Mar 20	Plesetsk	SL-8	825	105.0	970	1,014	82.9	Navigation
Kosmos 2062	1990 024A	USSR	Mar 22	Plesetsk	SL-4	6,300	90.6	211	248	82.3	Photo recon. Reentered 4/5
GPS 2-7	1990 025A	US	Mar 26	ESMC	Delta 2	1,665	718.0	20,093	20,271	55.2	Global Positioning System
Kosmos 2063	1990 026A	USSR	Mar 27	Plesetsk	SL-6	1,900	717.9	812	39,549	63.6	Early warning
Ofeq 2	1990 027A	Isrl	Apr 3	Yavne	Shavit	160	102.5	209	1,577	143.2	Space technology experiments, two-way communications, remote control of systems. Reentered 7/9
Pegsat	1990 028A	US	Apr 5	Pacific	Pegasus	178	95.6	453	645	94.1	Chemical release experiment. First of two payloads deployed by Pegasus launch vehicle dropped from airborne B-52
USA 55	1990 028B	US	Apr 5	Pacific	Pegasus	25	96.3	487	661	94.1	Deployed by Pegasus
Kosmos 2064	1990 029A	USSR	Apr 6	Plesetsk	SL-8	45	115.4	1,460	1,488	74.0	Tactical communications
Kosmos 2065	1990 029B	USSR	Apr 6	Plesetsk	SL-8	45	115.2	1,459	1,473	74.0	Tactical communications
Kosmos 2066	1990 029C	USSR	Apr 6	Plesetsk	SL-8	45	114.3	1,384	1,461	74.0	Tactical communications
Kosmos 2067	1990 029D	USSR	Apr 6	Plesetsk	SL-8	45	114.4	1,399	1,461	74.0	Tactical communications
Kosmos 2068	1990 029E	USSR	Apr 6	Plesetsk	SL-8	45	114.6	1,413	1,461	74.0	Tactical communications
Kosmos 2069	1990 029F	USSR	Apr 6	Plesetsk	SL-8	45	114.8	1,427	1,460	74.0	Tactical communications

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 2070	1990 029G	USSR	Apr 6	Plesetsk	SL-8	45	114.9	1,441	1,461	74.0	Tactical communications
Kosmos 2071	1990 029H	USSR	Apr 6	Plesetsk	SL-8	45	115.1	1,457	1,460	74.0	Tactical communications
Asiasat 1	1990 030A	UK	Apr 7	Xichang	CZ-3	1,442	1,436.2	35,782	35,795	0.1	1st commercial launch for Chinese. Telecommunications satellite located above 105 deg. e. Formerly Westar 6, retrieved by STS-51A, 1984
USA 56	1990 031A	US	Apr 11	WSMC	Atlas E		Elements not available				
USA 57	1990 031B	US	Apr 11	WSMC	Atlas E		Elements not available				
USA 58	1990 031C	US	Apr 11	WSMC	Atlas E		Elements not available				
Foton 3	1990 032A	USSR	Apr 11	Plesetsk	SL-4	6,200	90.3	213	365	62.8	Soviet and French microgravity experiments. Reentered 4/27
Kosmos 2072	1990 033A	USSR	Apr 13	Tyuratam	SL-4	6,300	89.7	235	280	64.8	Photo recon. Reentered 11/21
Palapa B-2R	1990 034A	Indo	Apr 13	ESMC	Delta 2	1,200	1,436.3	35,786	35,793	0.0	Refurbished Palapa B2 retrieved by STS-51A. Indonesian communications, stationed above 107.7 deg. e
Kosmos 2073	1990 035A	USSR	Apr 17	Plesetsk	SL-4	6,300	88.6	173	239	82.4	Photo recon. Reentered 4/28
Kosmos 2074	1990 036A	USSR	Apr 20	Plesetsk	SL-8	825	104.8	964	1,002	82.9	Navigation
STS-31	1990 037A	US	Apr 24	KSC	Discovery	117,430*	97.0	610	619	28.5	Crew: Loren Shriver, commander; Charles Bolden, pilot; Bruce McCandless, Steven Hawley, Kathryn Sullivan, mission specialists. Deployed HST. Landed 4/29, after 5 days, 1 hr, 16 mn
HST	1990 037B	US	Apr 25	STS	RMS	10,863	97.0	611	620	28.5	Hubble Space Telescope. Largest orbiting observatory launched to date. Although flaw in mirror hampered performance, good data returned
Kosmos 2075	1990 038A	USSR	Apr 25	Plesetsk	SL-8	1,000	94.0	456	482	74.0	Minor military
Molniya 1-77	1990 039A	USSR	Apr 26	Plesetsk	SL-6	1,600	717.7	879	39,471	62.8	Domestic communications
Kosmos 2076	1990 040A	USSR	Apr 28	Plesetsk	SL-6	1,900	717.1	726	39,625	63.2	Early warning

*Total liftoff weight, 2,045,895 kg

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Progress 42	1990 041A	USSR	May 5	Tyuratam	SL-4	7,150	92.2	389	403	51.6	Resupplied Mir. Docked 5/7. Undocked, reentered 5/27. Last of original Progress spacecraft
Kosmos 2077	1990 042A	USSR	May 7	Plesetsk	SL-4	6,500	89.7	178	377	62.8	Photo recon. Reentered 7/4
Macsat 1	1990 043A	US	May 9	WSMC	Scout	68	98.5	605	765	89.9	Multiple Access Communications. Global store/forward relay for DoD
Macsat 2	1990 043B	US	May 9	WSMC	Scout	68	98.5	605	765	89.9	Multiple Access Communications. Global store/forward relay for DoD
Kosmos 2078	1990 044A	USSR	May 15	Tyuratam	SL-4	6,500	89.3	196	280	70.0	Photo recon. Reentered 6/28
Kosmos 2079	1990 045A	USSR	May 19	Tyuratam	SL-12	1,400	675.7	19,068	19,190	65.0	Glonass navigation system
Kosmos 2080	1990 045B	USSR	May 19	Tyuratam	SL-12	1,400	675.7	19,111	19,147	65.0	Glonass navigation system
Kosmos 2081	1990 045C	USSR	May 19	Tyuratam	SL-12	1,400	675.7	19,094	19,164	65.0	Glonass navigation system
Kosmos 2082	1990 046A	USSR	May 22	Tyuratam	SL-16	9,000	101.9	846	852	71.0	Elint
Resurs-F6	1990 047A	USSR	May 29	Plesetsk	SL-4	6,300	89.8	255	268	82.3	Remote sensing, German microgravity experiment. Reentered 6/14
Kristall	1990 048A	USSR	May 31	Tyuratam	SL-13	19,640	92.2	377	392	51.6	Materials processing laboratory, permanently affixed to Mir. Docked 6/10
Rosat	1990 049A	FRG	Jun 1	ESMC	Delta 2	2,426	96.1	560	578	53.0	West German X-ray telescope. All sky survey of X-ray and extreme ultraviolet sources
USA 59	1990 050A	US	Jun 8	ESMC	Titan 4		Elements not available				
USA 60	1990 050B	US	Jun 8	ESMC	Titan 4		Elements not available				
USA 61	1990 050C	US	Jun 8	ESMC	Titan 4		Elements not available				
USA 62	1990 050D	US	Jun 8	ESMC	Titan 4		Elements not available				
Insat 1D	1990 051A	India	Jun 12	ESMC	Delta	1,190	1,436.2	35,781	35,795	0.1	Indian domestic communications. Stationed above 83.1 deg. e
Molniya 3-38	1990 052A	USSR	Jun 13	Plesetsk	SL-6	1,750	717.7	758	39,593	62.9	Domestic communications
Kosmos 2083	1990 053A	USSR	Jun 19	Plesetsk	SL-4	6,300	91.4	268	428	82.5	Photo recon. Reentered 7/3

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Gorizont 20	1990 054A	USSR	Jun 20	Tyuratam	SL-12	2,125	1,436.1	35,760	35,813	1.0	Domestic communications. Located above 90 deg. e
Kosmos 2084	1990 055A	USSR	Jun 21	Plesetsk	SL-6	1,900	98.1	563	770	62.8	Early warning. 4th stage failure. Replaced by Kosmos 2087
Intelsat 6 F4	1990 056A	ITSO	Jun 23	ESMC	Titan III	4,215	1,436.2	35,775	35,800	0.0	International communications. Located above 27.5 deg. w. Moved to 63 e in 1991
Meteor 2-19	1990 057A	USSR	Jun 27	Plesetsk	SL-14	1,750	104.0	937	961	82.5	Meteorological
Gamma	1990 058A	USSR	Jul 11	Tyuratam	SL-4	7,350	92.5	395	398	51.6	Gamma radiation observatory. Decayed 2/28/92
Badr-1	1990 059A	Pak	Jul 16	Xichang	CZ-2E	52	96.3	201	984	28.4	1st launch of new Chinese booster. Experimental Pakistani payload. Reentered 12/8
Resurs-F7	1990 060A	USSR	Jul 17	Plesetsk	SL-4	6,300	88.8	193	276	82.3	Remote sensing. Reentered 8/16
Kosmos 2085	1990 061A	USSR	Jul 18	Tyuratam	SL-12	2,150	1,436.2	35,762	35,813	1.0	Communications. Stationed over 80 deg. e
Kosmos 2086	1990 062A	USSR	Jul 20	Plesetsk	SL-4	6,300	90.3	234	344	82,3	Photo recon. Reentered 8/3
TDF-2	1990 063A	France	Jul 24	Kourou	Ariane 4	2,096	1,436.2	35,782	35,793	1.1	French direct broadcast. Positioned above 19 deg. w
DFS-2	1990 063B	FRG	Jul 24	Kourou	Ariane 4	1,418	1,436.1	35,715	35,859	0.0	West German direct broadcast. Stationed above 28.5 deg. e
Kosmos 2087	1990 064A	USSR	Jul 25	Plesetsk	SL-6	1,900	717.8	924	39,431	62.9	Early warning. Replaced Kosmos 2084
CRRES	1990 065A	US	Jul 25	ESMC	Atlas 1	1,629	591.0	323	33,575	18.2	Combined Release and Radiation Effects Satellite. First commercial launch for Atlas 1
Kosmos 2088	1990 066A	USSR	Jul 30	Plesetsk	SL-14	900	116.0	1,481	1,522	73.6	GEO 1K geodetic
Soyuz TM-10	1990 067A	USSR	Aug 1	Tyuratam	SL-4	7,150	91.2	312	381	51.6	Carried Gennady Manakov and Gennedy Strekalov to Mir. Docked 8/3. Undocked, returned with cosmonauts 12/10. Flight time: 130 days, 20 hrs, 36 mn
GPS 2-8	1990 068A	US	Aug 2	ESMC	Delta 2	1,665	718.0	19,928	20,436	54.7	Global Positioning System
Kosmos 2089	1990 069A	USSR	Aug 3	Plesetsk	SL-4	6,500	89.9	186	357	62.8	Photo recon. Reentered 10/1
Kosmos 2090	1990 070A	USSR	Aug 8	Plesetsk	SL-14	225	113.8	1,387	1,411	82.6	New Locsyst communications system. Groups of 6 satellites placed in 4 orbital planes 90 deg. apart

Summary Log of Space Launches 1990

			Launch Data				Orbital Data				
Name	**Int'l Desig.**	**Proj. Dir.**	**Date**	**Site**	**Vehicle**	**Weight (kg)**	**Period**	**Perigee**	**Apogee**	**Incl.**	**Status**
Kosmos 2091	1990 070B	USSR	Aug 8	Plesetsk	SL-14	225	114.0	1,409	1,412	82.6	Locsyst communications
Kosmos 2092	1990 070C	USSR	Aug 8	Plesetsk	SL-14	225	114.0	1,403	1,412	82.6	Locsyst communications
Kosmos 2093	1990 070D	USSR	Aug 8	Plesetsk	SL-14	225	113.9	1,397	1,412	82.6	Locsyst communications
Kosmos 2094	1990 070E	USSR	Aug 8	Plesetsk	SL-14	225	113.8	1,392	1,412	82.6	Locsyst communications
Kosmos 2095	1990 070F	USSR	Aug 8	Plesetsk	SL-14	225	113.7	1,380	1,412	82.6	Locsyst communications
None		USSR	Aug 9	Tyuratam	SL-12						Third stage failuire
Molniya 1-78	1990 071A	USSR	Aug 10	Plesetsk	SL-6	1,600	717.7	648	39,706	62.9	Domestic communications
Progress M-4	1990 072A	USSR	Aug 15	Tyuratam	SL-4	7,250	92.1	368	381	51.6	Resupplied Mir. Docked 8/17; undocked 9/17; reentered 9/20
Resurs-F8	1990 073A	USSR	Aug 16	Plesetsk	SL-4	6,300	88.5	176	229	82.3	Remote sensing. Reentered 9/1
Marcopolo 2	1990 074A	UK	Aug 18	ESMC	Delta 2	1,220	1,436.5	35,717	35,871	0.1	British direct broadcast, second in series. Stationed above 31 deg. w
Kosmos 2096	1990 075A	USSR	Aug 23	Tyuratam	F-l-m	4,000	92.7	402	415	65.0	Ocean recon.
Kosmos 2097	1990 076A	USSR	Aug 28	Plesetsk	SL-6	1,900	717.5	707	39,630	63.4	Early warning
BS-3A	1990 077A	Japan	Aug 28	Tanegashima	H-1	1,115	1,436.1	35,782	35,794	0.2	Japanese direct broadcast, located above 110 deg. e. Renamed Yuri 3A after launch
Kosmos 2098	1990 078A	USSR	Aug 28	Plesetsk	SL-8	550	108.9	394	1,957	83.0	Minor military
Skynet 4C	1990 079A	UK	Aug 30	Kourou	Ariane 4	1,463	1,436.1	35,771	35,802	3.9	UK defense communications. Placed above 1 deg. w
Eutelsat 2 F1	1990 079B	ESA	Aug 30	Kourou	Ariane 4	1,878	1,382.7	32,556	36,912	0.4	European telecommunications. Located over 13 deg. e
Kosmos 2099	1990 080A	USSR	Aug 31	Plesetsk	SL-4	6,300	90.4	244	366	82.3	Photo recon. Reentered 9/14
Fengyun 1-2	1990 081A	PRC	Sep 3	Taiyuan	CZ-4	881	102.8	881	896	99.0	Meteorological
PRC 31	1990 081B	PRC	Sep 3	Taiyuan	CZ-4	4	101.7	775	804	99.0	Atmospheric balloon. Decayed 3/11/91
PRC 32	1990 081C	PRC	Sep 3	Taiyuan	CZ-4	4	101.9	833	886	99.0	Atmospheric balloon. Decayed 7/24/91
Resurs-F9	1990 082A	USSR	Sep 7	Plesetsk	SL-4	6,300	89.8	267	288	82.5	German microgravity experiment. Reentered 9/21
Kosmos 2100	1990 083A	USSR	Sep 14	Plesetsk	SL-8	810	104.8	957	1,011	82.9	Navigation

Summary Log of Space Launches 1990

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Molniya 3-39	1990 084A	USSR	Sep 20	Plesetsk	SL-6	1,750	717.8	625	39,728	62.9	Domestic communications
Progress M-5	1990 085A	USSR	Sep 27	Tyuratam	SL-4	2,050	92.3	371	406	51.6	Resupplied Mir. Carried first recoverable capsule to return materials to earth. Docked 9/29. Undocked, reentered 11/28
Meteor 2-20	1990 086A	USSR	Sep 28	Plesetsk	SL-14	1,750	104.0	940	958	82.5	Meteorological
Kosmos 2101	1990 087A	USSR	Oct 1	Tyuratam	SL-4	6,700	89.1	168	286	64.8	Photo recon. Intentionally destroyed. Reentered 11/30
GPS 2-9	1990 088A	US	Oct 1	ESMC	Delta 2	1,665	718.0	19,859	20,504	54.9	Global Positioning System
Kosmos		USSR	Oct 4	Tyuratam	SL-16						Launch failure. Booster exploded seconds after liftoff
PRC-33	1990 089A	PRC	Oct 5	Jiuquan	CZ-2C	2.6 Tons	89.3	199	295	56.9	Biological research. Chinese name: Fanhui Shu Weixing. Capsule recovered 10/13. Bus decayed 10/23
STS-41	1990 090A	US	Oct 6	KSC	Discovery	116,117*	90.2	280	303	28.4	Crew: Richard Richards, commander; Robert Cabana, pilot; Bruce Melnick, William Shepherd, Thomas Akers, mission specialists. Deployed Ulysses. Landed 10/10, after 4 days, 2 hrs, 10 mn
Ulysses	1990 090B	US	Oct 6	STS	IUS	367	Interplanetary trajectory				Enroute to scheduled 2/92 flyby of Jupiter. Gravity will alter trajectory, sending craft on flight path downward from ecliptic plane. Ulysses will end up in solar orbit ranging from 5.4 to 1.3 AU
SBS 6	1990 091A	US	Oct 12	Kourou	Ariane 4	2,478	1,436.0	35,796	35,775	0.0	Commercial communications. Positioned above 99 deg. w
Galaxy 6	1990 091B	US	Oct 12	Kourou	Ariane 4	1,212	1,436.2	35,281	35,796	0.0	Commercial communications. Stationed above 91 deg. w. Moved to 99 w in 1991
Kosmos 2102	1990 092A	USSR	Oct 16	Plesetsk	SL-4	6,700	89.7	192	360	62.8	Photo recon. Reentered 12/12
Inmarsat 2-1	1990 093A	UK	Oct 30	ESMC	Delta 2	1,385	1,436.3	35,706	35,873	2.3	Mobile communications. Located above 64.5 deg. e
Gorizont 21	1990 094A	USSR	Nov 3	Tyuratam	SL-12	2,125	1,436.0	35,781	35,788	1.3	Domestic communications. Located above 90 deg. e
USA 65	1990 095A	US	Nov 13	ESMC	Titan 4		Elements not available				

*Total liftoff weight, 2,049,816 kg

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Kosmos 2103	1990 096A	USSR	Nov 14	Tyuratam	SL-11	4,000	92.7	399	411	65.0	Eorsat. Propulsion system failed 1/91. Decayed 4/3/91
STS-38	1990 097A	US	Nov 15	KSC	Atlantis		88.6	215	221	28.4	Crew: Richard Covey, commander; Frank Culbertson, pilot; Charles Gamar, Robert Springer, Carl Mead, mission specialists. Reentered 11/20, after 4 days, 21 hrs, 54 mns
USA 67	1990 097B	US	Nov 15	STS			Elements not available				
Kosmos 2104	1990 098A	USSR	Nov 16	Plesetsk	SL-4	6,300	90.5	238	361	62.8	Photo recon. Reentered 12/4
Kosmos 2105	1990 099A	USSR	Nov 20	Plesetsk	SL-6	1,900	717.7	613	39,737	63.4	Early warning
Satcom SL-6	1990 100A	US	Nov 20	Kourou	Ariane 4	1,169	1,436.1	35,771	35,801	0.0	Commercial communications. Stationed above 137 deg. w
GStar 4	1990 100B	US	Nov 20	Kourou	Ariane 4	1,295	1,436.1	35,774	35,798	0.0	Commercial communications. Positioned above 125 deg. w
Molniya 1-79	1990 101A	USSR	Nov 23	Plesetsk	SL-6	1,600	717.7	584	39,767	62.9	Domestic communications
Gorizont 22	1990 102A	USSR	Nov 23	Tyuratam	SL-12	1,125	1,435.9	35,762	35,804	1.3	Domestic communications. Placed above 40 deg. e
GPS 2-10	1990 103A	US	Nov 26	ESMC	Delta 2	1,665	718.0	20,072	20,092	54.9	Global positioning system
Kosmos 2106	1990 104A	USSR	Nov 28	Plesetsk	SL-14	3,000	95.1	510	533	82.5	Minor military
DMSP 10	1990 105A	US	Dec 1	WSMC	Atlas E	750	100.6	729	845	98.9	Defense Meteorological Satellite Program. Weather imaging. Operational even though broken nozzle prevented it from reaching desired orbit.
STS-35	1990 106A	US	Dec 2	KSC	Columbia	121,183*	91.7	350	363	28.5	Crew: Vance Brand, commander; Guy Gardner, pilot; Mike Lounge, Robert Parker, Jeffrey Hoffman, mission specialists; Samuel Durrance, Ronald Parise, payload specialists. Hosted Astro-1 astronomy experiment. Returned 12/11 after 8 days, 23 hrs, 5 mns

*Total liftoff weight, 2,049,009 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Soyuz TM-11	1990 107A	USSR	Dec 2	Tyuratam	SL-4	7,150	92.2	364	398	51.6	Ferried Viktor Afanasyev, Musa Manarov, Japanese journalist Toyohiro Akiyama to Mir. Docked 12/4. Akiyama returned aboard Soyuz TM-10. His flight time: 7 days, 21 hr, 55 mn. Undocked, reentered 5/26/91. Flight time: 175 days, 1 hr, 52 mn.
Kosmos 2107	1990 108A	USSR	Dec 4	Tyuratam	SL-11	4,000	92.7	401	415	65.0	Ocean surveillance
Kosmos 2108	1990 109A	USSR	Dec 4	Plesetsk	SL-4	6,700	89.5	181	310	62.8	Photo recon. Reentered 1/28/91
Kosmos 2109	1990 110A	USSR	Dec 8	Tyuratam	SL-12	1,400	675.7	18,970	19,288	64.8	Glonass navigation system
Kosmos 2110	1990 110B	USSR	Dec 8	Tyuratam	SL-12	1,400	675.7	19,027	19,231	64.9	Glonass navigation system
Kosmos 2111	1990 110C	USSR	Dec 8	Tyuratam	SL-12	1,400	675.7	19,107	19,151	64.8	Glonass navigation system
Kosmos 2112	1990 111A	USSR	Dec 10	Plesetsk	SL-8	900	100.6	767	810	74.0	Communications
Raduga 26	1990 112A	USSR	Dec 20	Tyuratam	SL-12	1,965	1,436.0	35,724	35,846	1.4	Domestic communications. Located above 85 deg. e
Kosmos 2113	1990 113A	USSR	Dec 21	Tyuratam	SL-4	7,000	89.6	230	276	64.8	Photo recon. Decayed 6/11/91
Kosmos 2114	1990 114A	USSR	Dec 22	Plesetsk	SL-14	225	114.0	1,407	1,412	82.6	Locsyst communications system. See Kosmos 2090-2095
Kosmos 2115	1990 114B	USSR	Dec 22	Plesetsk	SL-14	225	113.9	1,405	1,408	82.6	Locsyst communications system
Kosmos 2116	1990 114C	USSR	Dec 22	Plesetsk	SL-14	225	113.9	1,399	1,408	82.6	Locsyst communications system
Kosmos 2117	1990 114D	USSR	Dec 22	Plesetsk	SL-14	225	113.8	1,393	1,408	82.6	Locsyst communications system
Kosmos 2118	1990 114E	USSR	Dec 22	Plesetsk	SL-14	25	113.8	1,389	1,408	82.6	Locsyst communications system
Kosmos 2119	1990 114F	USSR	Dec 22	Plesetsk	SL-14	225	113.7	1,382	1,408	82.6	Locsyst communications system
Kosmos 2120	1990 115A	USSR	Dec 26	Plesetsk	SL-4	6,300	90.2	231	336	82.6	Photo recon. Reentered 1/17/91
Raduga 1-2	1990 116A	USSR	Dec 27	Tyuratam	SL-12	2,000	1,436.3	35,607	35,973	1.5	Domestic communications. Placed above 49 deg. e
Nato IVA	1991 001A	NATO	Jan 8	ESMC	Delta 2	1,433	1,436.2	35,780	35,794	3.6	Voice, data communications for NATO countries, military command and control for NATO forces. Positioned above 18 deg. w
Progress M-6	1991 002A	USSR	Jan 14	Tyuratam	SL-4	7,250	88.2	186	205	51.6	Resupplied Mir. Docked 1/16. Undocked, reentered 3/15

Summary Log of Space Launches 1957-1991

			Launch Data				Orbital Data				
Name	Int'l Desig.	Proj. Dir.	Date	Site	Vehicle	Weight (kg)	Period	Perigee	Apogee	Incl.	Status
Italsat 1	1991 003A	Italy	Jan 15	Kourou	Ariane 44L	1,865	1,436.1	35,703	35,870	0.0	Experimental commsat for proposed Italian digital network. Placed above 13.2 deg e
Eutelsat 2 F2	1991 003B	ESA	Jan 15	Kourou	Ariane 44L	1,878	1,434.4	33,408	38,098	0.1	European telecommunications. Located above 10 deg e
Kosmos 2121	1931 004A	USSR	Jan 17	Plesetsk	SL-4	6,300	89.8	238	323	82.5	Photo recon. Reentered 2/10
Kosmos 2122	1991 005A	USSR	Jan 18	Tyuratam	SL-11	4,000	92.7	402	415	65.0	Elint
Informatr 1	1991 006A	USSR	Jan 29	Plesetsk	SL-8	800	104.7	953	1,008	82.9	Experimental commsat. Gathered geologic data. Carried transponders for amateur radio
Kosmos 2123	1991 007A	USSR	Feb 5	Plesetsk	SL-8	810	104.8	959	1,005	82.9	Navigation
Kosmos 2124	1991 008A	USSR	Feb 7	Plesetsk	SL-4	6,700	89.0	175	271	62.8	Photo recon. Reentered 4/7
Kosmos 2125	1991 009A	USSR	Feb 12	Plesetsk	SL-8	40	115.2	1,456	1,470	74.0	Military communications
Kosmos 2126	1991 009B	USSR	Feb 12	Plesetsk	SL-8	40	115.5	1,464	1,495	74.0	Military communications
Kosmos 2127	1991 009C	USSR	Feb 12	Plesetsk	SL-8	40	115.3	1,464	1,476	74.0	Military communications
Kosmos 2128	1991 009D	USSR	Feb 12	Plesetsk	SL-8	40	115.0	1,443	1,466	74.0	Military communications
Kosmos 2129	1991 009E	USSR	Feb 12	Plesetsk	SL-8	40	114.8	1,428	1,467	74.0	Military communications
Kosmos 2130	1991 009F	USSR	Feb 12	Plesetsk	SL-8	40	114.5	1,399	1,467	74.0	Military communications
Kosmos 2131	1991 009G	USSR	Feb 12	Plesetsk	SL-8	40	114.4	1,385	1,[illegible]65	74.0	Military communications
Kosmos 2132	1991 009H	USSR	Feb 12	Plesetsk	SL-8	40	114.7	1,413	1,466	74.0	Military communications
Kosmos 2133	1991 010A	USSR	Feb 14	Tyuratam	SL-12	2,150	1,442.2	35,744	36,067	1.6	Remote sensing. Positioned above 13 deg. e
Kosmos 2134	1991 011A	USSR	Feb 15	Tyuratam	SL-4	6,700	89.2	212	262	64.7	Photo recon. Reentered 4/1
Molniya 1-80	1991 012A	USSR	Feb 15	Plesetsk	SL-6	1,600	717.8	755	39,598	63.0	Domestic communications
Kosmos 2135	1991 013A	USSR	Feb 26	Plesetsk	SL-8	810	104.5	919	1,019	82.8	Navigation
Radugn 27	1991 014A	USSR	Feb 28	Tyuratam	SL-12	1,965	1,435.9	35,780	35,786	0.8	Domestic communications. Stationed above 128 deg. e
Astra 1B	1991 015A	Luxmbg	Mar 2	Kourou	Ariane 44LP	2,620	1,436.0	35,600	35,970	0.1	Direct broadcast serving most of Europe. Located above 19.2 deg. e

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
MOP-2 (Meteosat 5)	1991 015B	ESA	Mar 2	Kourou	Ariane 44LP	681	1,436.3	35,787	35,792	0.7	Meteosat Operational Program. Earth imaging for weather forecasting, climatology, atmospheric physics. Stationed above 4 deg. e
Kosmos 2136	1991 016A	USSR	Mar 6	Tyuratam	SL-4	6,300	89.0	211	272	62.8	Photo recon. Reentered 3/20
USA 69	1991 017A	US	Mar 8	WSMC	Titan 4		98.2	672	679	68.0	
Inmarsat 2 F2	1991 018A	UK	Mar 8	ESMC	Delta 2	1,385	1,436.2	35,778	35,796	2.4	Mobile/maritime communications. Positioned above 15.5 deg. w
Nadezhda-3	1991 019A	USSR	Mar 12	Plesetsk	SL-8	825	104.9	958	1,018	82.9	Civilian navigation. Carried COSPAS package
Progress M-7	1991 020A	USSR	Mar 19	Tyuratam	SL-4	7,250	89.4	237	282	51.6	Resupplied Mir. Docked 3/28. Undocked and reentered 5/7. Return capsule lost
Kosmos 2137	1991 021A	USSR	Mar 19	Plesetsk	SL-8	1,000	93.3	416	459	65.8	Elint
Molniya 3-40	1991 022A	USSR	Mar 22	Plesetsk	SL-6	1,750	717.6	759	39,587	62.9	Domestic communications
Kosmos 2138	1991 023A	USSR	Mar 26	Tyuratam	SL-4	6,700	89.2	170	334	56.1	Photo recon. Reentered 5/24
Almaz 1	1991 024A	USSR	Mar 31	Tyuratam	SL-13	18,550	90.5	293	305	72.7	Remote earth sensing; radar imaging
Kosmos 2139	1991 025A	USSR	Apr 4	Tyuratam	SL-12	1,400	675.7	19,104	19,154	64.9	Glonass navigation system
Kosmos 2140	1991 025B	USSR	Apr 4	Tyuratam	SL-12	1,400	675.7	19,097	19,161	64.9	Glonass navigation system
Kosmos 2141	1991 025C	USSR	Apr 4	Tyuratam	SL-12	1,400	675.7	19,105	19,153	64.9	Glonass navigation system
Anik E2	1991 026A	Canada	Apr 4	Kourou	Ariane 44P	2,923	1,436.1	35,778	35,796	0.0	Canadian telecommunications. Stationed above 107.3 deg. w
STS-37	1991 027A	US	Apr 5	KSC	Atlantis	115,502*	93.8	449	465	28.5	Crew: Steven Nagel, Ken Cameron, Linda Godwin, Jerry Ross, Jay Apt. Deployed one satellite. Reentered 4/11 after 5 days, 23 hrs, 33 mns
GRO	1991 027B	US	Apr 7	Atlantis		15,620	93.1	416	432	28.5	Gamma ray studies. 2nd of 4 NASA Great Observatories. Renamed Compton Gamma Ray Observatory once on orbit

*Total liftoff weight, 2,047,178 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
ASC 2 (Spacenet 4)	1991 028A	US	Apr 13	ESMC	Delta 2	1,350	1,436.4	35,781	35,793	0.0	Commercial business communications. Positioned above 101 deg. w
Kosmos 2142	1991 029A	USSR	Apr 16	Plesetsk	SL-8	810	104.9	961	1,015	83.0	Navigation
BS-3H		Japan	Apr 18	ESMC	Atlas Centaur						Centaur engine failure. Destroyed by range safety 6 mns after launch
Meteor 3-4	1991 030A	USSR	Apr 24	Plesetsk	SL-14	2,215	109.3	1,184	1,210	82.5	Meteorology
STS-39	1991 031A	US	Apr 28	KSC	Discovery	111,884*	89.4	249	263	56.9	Crew: Mike Coats, Blaine Hammond, Greg Harbaugh, Don McMonagle, Guy Bluford, Lacy Veach, Rick Heib. Carried military payload. Reentered 5/6 after 8 days, 7 hrs, 22 mns
IBSS	1991 031B	US	May 1	Discovery		1,901	89.4	248	263	56.9	Infrared Background Signature Survey instrument mounted on Shuttle Pallet Satellite (SPAS). Deployed by RMS 5/1; recovered 5/2 Reentered with STS-39, 5/6
USA 70	1991 031C	US	May 6	Discovery				Elements not available			
CRO-C	1991 031D	US	May 2	Discovery		197	89.5	243	261	56.9	Chemical Release Observation canister. Deployed from shuttle. Released gases for observation by IBSS. Decayed 5/14
CRO-B	1991 031E	US	May 2	Discovery		197	89.4	244	256	56.9	Chemical Release Observation canister. Deployed from shuttle. Decayed 5/12
CRO-A	1991 031F	US	May 3	Discovery		197	89.6	250	270	56.9	Chemical Release Observation canister. Deployed from shuttle. Decayed 5/13
NOAA 12	1991 032A	US	May 14	WSMC	Atlas E	1,416	101.2	807	825	98.7	National Oceanographic and Atmospheric Administration meteorology satellite
Kosmos 2143	1991 033A	USSR	May 16	Plesetsk	SL-14	225	113.9	1,397	1,413	82.6	Tactical communications
Kosmos 2144	1991 033B	USSR	May 16	Plesetsk	SL-14	225	114.0	1,410	1,413	82.6	Tactical communications
Kosmos 2145	1991 033C	USSR	May 16	Plesetsk	SL-14	225	114.0	1,403	1,413	82.6	Tactical communications

*Total liftoff weight, 2,044,252 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 2146	1991 033D	USSR	May 16	Plesetsk	F-2	225	113.9	1,392	1,413	82.6	Tactical communications
Kosmos 2147	1991 033E	USSR	May 16	Plesetsk	F-2	225	113.8	1,387	1,413	82.6	Tactical communications
Kosmos 1248	1991 033F	USSR	May 16	Plesetsk	F-2	225	113.7	1,380	1,413	82.6	Tactical communications
Soyuz TM-12	1991 034A	USSR	May 18	Tyuratam	SL-4	7,150	91.9	362	372	51.6	Crew: Anatoli Artsebarski, Sergei Krikalev, British cosmonaut Helen Sharman. Docked with Mir 5/20. Undocked, reentered with Artsebarski, TM-8 crew, 10/10, after 144 days, 15 hrs, 22 mn. Sharman returned via TM-11, 5/26, after 7 days, 21 hrs, 14 mn
Resurs-F 10	1991 035A	USSR	May 21	Plesetsk	SL-4	6,300	89.1	227	231	82.3	Earth resources, microgravity experiments. Reentered 6/20
Kosmos 2149	1991 036A	USSR	May 24	Plesetsk	SL-4	6,500	90.0	193	393	67.1	Photo recon. Reentered 7/4
Aurora 2 (Satcom C-5)	1991 037A	US	May 29	ESMC	Delta 2	1,336	1,436.1	35,795	35,778	0.0	Commercial communications, serving Alascom, GE Americom customers. Positioned above 139 deg. w
Progress M-8	1991 038A	USSR	May 30	Tyuratam	SL-4	7,250	91.9	363	370	51.6	Resupplied Mir. Docked 6/1. Undocked, reentered 8/16
Okean 3	1991 039A	USSR	Jun 4	Plesetsk	SL-14	1,900	97.6	627	659	82.5	Oceanography
STS-40	1991 040A	US	Jun 5	KSC	Columbia	113,430*	90.1	276	302	39.0	Crew: Bryan O'Connor, Sidney Gutierrez, James Bagian, Tamara Jernigan, Margaret Seddon, Drew Gaffney, Millie Hughes- Fulford. Carried Spacelab life sciences module (SLS-1). Reentered 6/14 after 9 days, 2 hrs, 14 mns
Kosmos 2150	1991 041A	USSR	Jun 11	Plsetsk	SL-8	900	100.7	780	806	74.0	Store/dump communications
Kosmos 2151	1991 042A	USSR	Jun 14	Plesetsk	SL-14	2,000	97.6	633	659	82.5	Elint
Molniya 1-81	1991 043A	USSR	Jun 18	Plesetsk	SL-6	1,600	717.8	547	39,810	63.0	Domestic communications
Kosmos		USSR	Jun 25	Plesetsk	SL-8	1,000					Second stage failure.
Resurs-F 11	1991 044A	USSR	Jun 28	Plesetsk	SL-4	6,300	89.7	253	268	82.3	Remote sensing. Reentered 7/21

*Total liftoff weight, 2,047,143 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
REX	1991 045A	US	Jun 29	WSMC	Scout	85	101.3	770	871	89.6	USAF Radiation Experiment. Tested communications gear in high-radiation environment
Gorizont 23	1991 046A	USSR	Jul 2	Tyuratam	SL-12	2,125	1,436.2	35,725	35,851	1.0	Domestic communications. Stationed above 103 deg.e
GPS 2-11	1991 047A	US	Jul 4	ESMC	Delta 2	1,665	718.0	20,076	20,289	55.3	Global Positioning System
Losat-X	1991 047B	US	Jul 4	ESMC	Delta 2	75	92.8	402	416	40.0	Low Altitude Satellite Experiment. Test flew DoD sensors. Reentered 11/15
Kosmos 2152	1991 048A	USSR	Jul 9	Plesetsk	SL-4	6,300	90.4	236	350	82.3	Photo recon. Reentered 7/23
Kosmos 2153	1991 049A	USSR	Jul 10	Tyuratam	SL-4	7,000	89.5	225	270	64.8	Photo recon.
ERS 1	1991 050A	ESA	Jul 17	Kourou	Ariane 4	2,384	100.3	774	775	98.5	ESA Remote Sensing satellite. Microwave, IR imaging of oceans, ice and land masses.
Uosat 5	1991 050B	UK	Jul 17	Kourou	Ariane 4	50	100.2	761	773	98.5	Science, communications, technology experiments for University of Surrey
Orbcomm-X	1991 050C	US	Jul 17	Kourou	Ariane 4	22	100.2	766	773	98.5	Store and forward communications
Tubsat	1991 050D	Germ	Jul 17	Kourou	Ariane 4	38	100.2	763	773	98.5	Store and forward communications
SARA	1991 050E	France	Jul 17	Kourou	Ariane 4	26	100.2	762	770	98.5	Radioastronomy
Microsat 1	1991 051A	US	Jul 17	Pacific	Pegasus	22	92.7	356	454	82.0	2nd Pegasus booster flight. Payload delivered to orbit by vehicle released from B-52. Microsats tested use of low-earth orbit for global communications. Reentered 1/23/92
Microsat 2	1991 051B	US	Jul 17	Pacific	Pegasus	22	92.7	359	457	82.0	Pegasus launch. See above. Reentered 1/23/92
Microsat 3	1991 051C	US	Jul 17	Pacific	Pegasus	22	92.5	355	442	82.0	Pegasus launch. See above. Reentered 1/24/92
Microsat 4	1991 051D	US	Jul 17	Pacific	Pegasus	22	92.7	359	457	82.0	Pegasus launch. See above. Reentered 1/23/92
Microsat 5	1991 051E	US	Jul 17	Pacific	Pegasus	22	92.7	360	457	82.0	Pegasus launch. See above. Reentered 1/24/92
Microsat 6	1991 051F	US	Jul 17	Pacific	Pegasus	22	92.7	359	458	82.0	Pegasus launch. See above. Reentered 1/25/92
Microsat 7	1991 051G	US	Jul 17	Pacific	Pegasus	22	92.7	359	458	82.0	Pegasus launch. See above. Reentered 1/23/92
Resurs-F 12	1991 052A	USSR	Jul 23	Plesetsk	SL-4	6,300	89.8	263	285	82.3	Remote sensing. Reentered 8/8

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Molniya 1	1991 053A	USSR	Aug 1	Plesetsk	SL-6	1,600	717.6	561	39,786	63.2	Domestic communications
STS-43	1991 054A	US	Aug 2	KSC	Atlantis	117,500*	90.6	309	329	28.4	Crew: John Blaha, Mike Baker, Shannon Lucid, David Low, James Adamson. Deployed one satellite. Returned 8/11 after 8 days, 21 hrs, 21 mns
TDRS 5	1991 054B	US	Aug 2	Atlantis	IUS	2,200	1,436.3	35,774	35,805	0.0	Tracking and Data Relay Satellite. Stationed above 174 deg. w
Intelsat 6 F5	1991 055A	ITSO	Aug 14	Kourou	Ariane 44L	4,296	1,436.2	35,732	35,845	0.0	International telecommunications and TV service. Positioned above 24.5 deg. w
Meteor 3-5	1991 056A	USSR	Aug 15	Plesetsk	SL-14	2,215	109.3	1,185	1,203	82.6	Meteorological. Carried U.S. Total Ozone Mapping Spectrometer (TOMS)
Progress M-9	1991 057A	USSR	Aug 20	Tyuratam	SL-4	7,250	90.9	292	341	51.7	Resupplied Mir. Docked 8/24. Undocked and reentered 9/30. Return capsule recovered
Resurs-F 13	1991 058A	USSR	Aug 21	Plesetsk	SL-4	6,300	89.1	226	230	82.3	Remote sensing. Reentered 9/20
Kosmos 2154	1991 059A	USSR	Aug 22	Plesetsk	SL-8	825	104.8	969	1,004	82.9	Military navigation
BS-3B	1991 060A	Japan	Aug 25	Tanegashima	H-1	1,115	1,436.1	35,775	35,796	0.1	Japanese TV broadcast. Stationed above 110 deg. e. Named changed to Yuri 3B
IRS-1B	1991 061A	India	Aug 29	Tyuratam	SL-3	980	103.1	890	918	99.2	Indian Remote Sensing satellite. Launched commercially by USSR
Kosmos		USSR	Aug 30	Tyuratam	SL-16	9,000					Second stage failure
Solar A	1991 062A	Japan	Aug 30	Kagoshima	M-3S2	420	97.8	522	783	31.3	X-ray imaging, investigations of solar phenomenon. Renamed Yohkoh
STS-48	1991 063A	US	Sep 12	KSC	Discovery	108,599**	95.4	538	553	56.9	Crew: John Creighton, Ken Reightler, Jim Buchli, Sam Gemar, Mark Brown. Deployed 1 satellite. Landed 9/18 after 5 days, 8 hrs, 28 mns

*Total liftoff weight, 2,050,499 kg

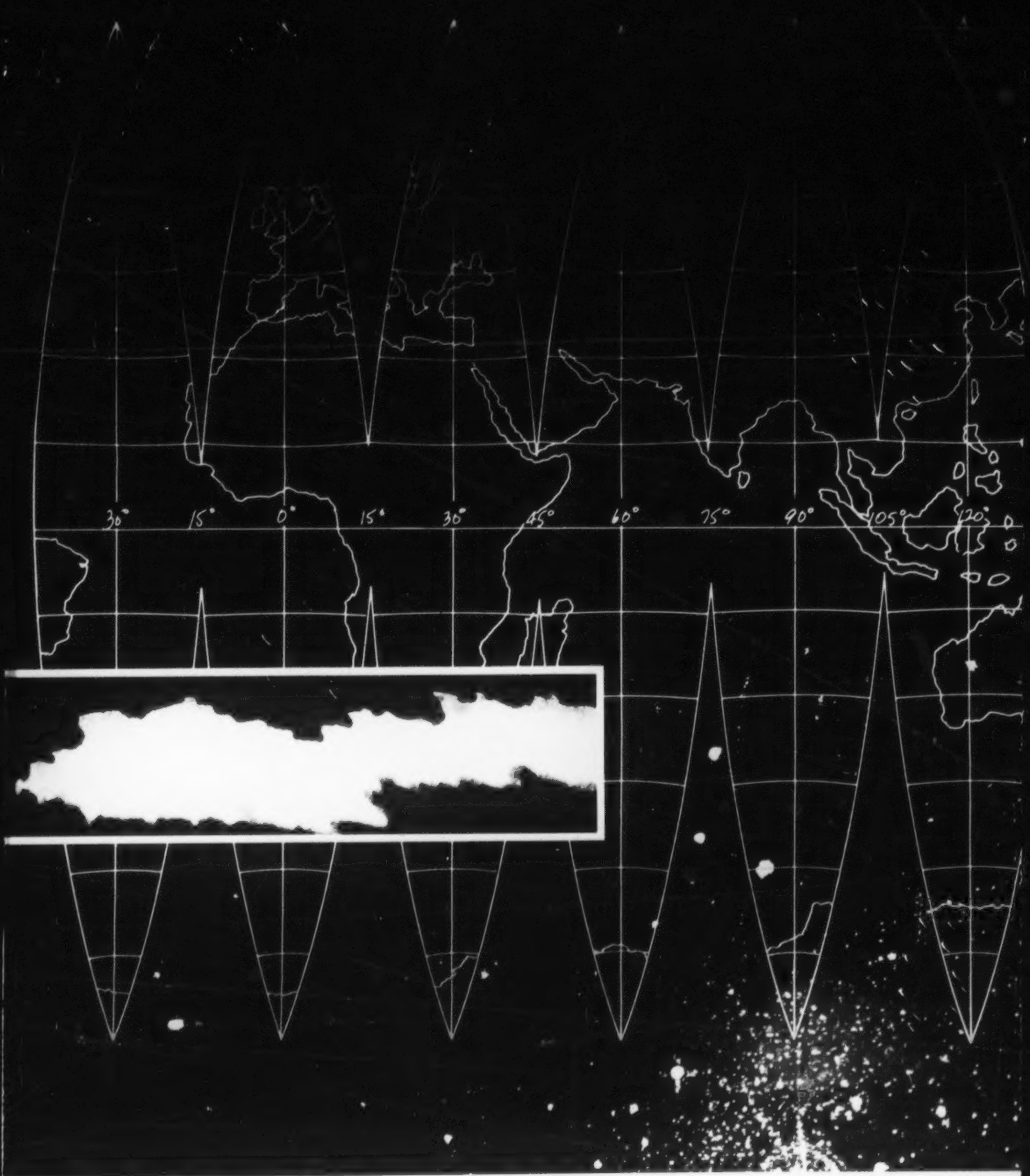
**Total liftoff weight, 2,041,828 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
UARS	1991 063B	US	Sep 15	Discovery	RMS	6,795	96.2	573	579	57.0	Upper Atmosphere Research Satellite. Measuring changes, ozone depletion in stratosphere and mesosphere
Kosmos 2155	1991 064A	USSR	Sep 13	Tyuratam	SL-12	2,150	1,436.2	35,763	35,815	1.1	Communications. Stationed above 336. deg .e
Molniya 3-41	1991 065A	USSR	Sep 17	Plestesk	SL-6	1,750	717.7	627	39,721	62.9	Domestic communications.
Kosmos 2156	1991 066A	USSR	Sep 19	Plesetsk	SL-4	6,500	89.7	193	362	67.1	Photo recon. Reentered 11/17
Anik E-1	1991 067A	Canada	Sep 26	Kourou	Ariane 44P	2,977	1,436.2	35,779	35,796	0.0	Canadian telecommunications. Positioned over 111.1 deg. w
Kosmos 2157	1991 068A	USSR	Sep 28	Plesetsk	SL-14	225	114.0	1,404	1,412	82.6	Tactical communications
Kosmos 2158	1991 068B	USSR	Sep 28	Plesetsk	SL-14	225	113.9	1,401	1,408	82.6	Tactical communications
Kosmos 2159	1991 068C	USSR	Sep 28	Plesetsk	SL-14	225	113.7	1,386	1,406	82.6	Tactical communications
Kosmos 2160	1991 068D	USSR	Sep 28	Plesetsk	SL-14	225	113.8	1,397	1,407	82.6	Tactical communications
Kosmos 2161	1991 068E	USSR	Sep 28	Plesetsk	SL-14	225	113.8	1,392	1,407	82.6	Tactical communications
Kosmos 2162	1991 068F	USSR	Sep 28	Plesetsk	SL-14	225	114.0	1,404	1,417	82.6	Tactical communications
Soyuz TM-13	1991 069A	USSR	Oct 2	Tyuratam	SL-4	7,150	90.2	274	296	51.6	Carried Aleksander Volkov, Tokbar Aubakirov, Austrian Franz Viehbock to Mir. Docked 10/4. Aubakirov, Viehbock returned via TM-12 after 7 days, 22 hrs, 13 mn
Foton 4	1991 070A	USSR	Oct 4	Plesetsk	SL-4	6,200	90.4	220	404	62.8	Materials processing. Hosted French and German microgravity experiments. Recovered 10/20
Kosmos 2163	1991 071A	USSR	Oct 9	Tyuratam	SL-4	6,500	90.2	212	358	64.8	Photo recon. Reentered 12/7
Kosmos 2164	1991 072A	USSR	Oct 10	Plesetsk	SL-8	750	94.5	295	726	73.9	Elint
Progress M-10	1991 073A	USSR	Oct 17	Tyuratam	SL-4	7,250	91.2	304	360	51.6	Resupplied Mir. Docked 10/21 after 10/19 attempt failed. Undocked, reentered 1/20/92. Return capsule recovered
Gorizont 24	1991 074A	USSR	Oct 23	Tyuratam	SL-12	2,125	1,435.8	35,776	35,792	1.4	Domestic communications. Positioned over 80 deg. e
Intelsat 6 F1	1991 075A	US	Oct 29	Kourou	Ariane 44L	4,330	1,436.0	35,900	35,674	0.1	International telecommunications. Located above 27.5 deg. w

Notes

Notes



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Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
USA 72	1991 076A	US	Nov 8	WSMC	Titan 4			Elements not available			
USA 74	1991 076C	US	Nov 8	WSMC	Titan 4			Elements not available			
USA 76	1991 076D	US	Nov 8	WSMC	Titan 4			Elements not available			
USA 77	1991 076E	US	Nov 8	WSMC	Titan 4			Elements not available			
Kosmos 2165	1991 077A	USSR	Nov 12	Plesetsk	SL-14	225	113.9	1,396	1,436	82.6	Tactical communications
Kosmos 2166	1991 077B	USSR	Nov 12	Plesetsk	SL-14	225	114.0	1,408	1,440	82.6	Tactical communications
Kosmos 2167	1991 077C	USSR	Nov 12	Plesetsk	SL-14	225	113.9	1,402	1,437	82.6	Tactical communications
Kosmos 2168	1991 077D	USSR	Nov 12	Plesetsk	SL-14	225	113.8	1,392	1,434	82.6	Tactical communications
Kosmos 2169	1991 077E	USSR	Nov 12	Plesetsk	SL-14	225	113.8	1,385	1,432	82.6	Tactical communications
Kosmos 2170	1991 077F	USSR	Nov 12	Plesetsk	SL-14	225	113.8	1,385	1,432	82.6	Tactical communications
Kosmos 2171	1991 078A	USSR	Nov 20	Plesetsk	SL-4	6,500	89.6	173	335	62.8	Photo recon. Reentered 1/17/92
Kosmos 2172	1991 079A	USSR	Nov 22	Tyuratam	SL-12	2,150	1,436.1	36,779	35,793	1.3	Communications. Stationed above 13 deg. w
STS-44	1991 080A	US	Nov 24	KSC	Atlantis	117,612*	91.6	361	368	28.4	Crew: Fred Gregory, Terence Henricks, James Voss, Story Musgrave, Mario Runco, Jr, Tom Hennen. Deployed one payload. Landed 12/1 after 6 days, 22 hrs, 51 mns.
DSP	1991 080B	US	Nov 25	Atlantis	IUS	2,355		Elements not available			Defense Support Program. First unclassified launch in this DoD early warning satellite program
Kosmos 2173	1991 081A	USSR	Nov 26	Plesetsk	SL-8	825	104.7	943	1,016	83.0	Navigation
DMSP 11	1991 082A	US	Nov 28	WSMC	Atlas E	830	101.9	835	855	98.9	Defense Meteorological Satellite Program
Eutelsat II	1991 083A	ESA	Dec 7	ESMC	Atlas 2	1,874	1,436.1	35,783	35,790	1.9	European Telecommunications Satellite Organization commsat. Located above 16 deg. e
Telecom 2A	1991 084A	France	Dec 16	Kourou	Ariane 44L	2,275	1,433.2	35,709	35,758	0.1	French telecommunications. Positioned above 3 deg. e
Inmarsat 2 F3	1991 084B	UK	Dec 16	Kourou	Ariane 44L	1,310	1,435.8	35,743	35,825	2.6	Global maritime and mobile communications. Stationed above 178 deg. e

* Total 2,050,401 kg

Summary Log of Space Launches 1957-1991

Name	Int'l Desig.	Proj. Dir.	Launch Data			Weight (kg)	Orbital Data				Status
			Date	Site	Vehicle		Period	Perigee	Apogee	Incl.	
Kosmos 2174	1991 085A	USSR	Dec 17	Tyuratam	SL-4	6,500	89.2	208	257	64.8	Photo recon. Reentered 1/30/92
Intercosmos 25	1991 086A	USSR	Dec 18	Plesetsk	SL-14	1,000	121.6	435	3,067	82.6	Science mission hosting experiments from Bulgaria, Germany, Hungary, Poland, Romania
Magion 3	1991 086E	Czech	Dec 28	Interkosmos		52	121.6	435	3,066	82.6	Czechoslovakian subsatellite
Raduga 28	1991 087A	USSR	Dec 19	Tyuratam	SL-12	2,000	1,436.6	35,761	35,829	1.5	Communications. Stationed above 35 deg. e
STTW 5	1991 088A	PRC	Dec 28	Xi Chang	CZ-3	1,025	617.6	205	35,087	31.6	Shiyong Tongbu Tongxin Weixing. Chinese domestic communications. Premature third stage shutdown cast it into unusable orbit